

Physiotherapy Superiority Over Drug Therapy According To IR Spectroscopy And Blood Spectrobiopsy

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Abstract— The study is devoted to revealing the evidentiary criterion of the physiotherapy superiority over drug therapy using parameters and methods of treatment in accordance with the clinical stage of the disease development, the results of labor expertise and improving the quality of life.

The foregoing have been confirmed with high statistical accuracy on the example of the newly created rehabilitating technology: "Underwater horizontal spinal traction with underwater phototherapy for the solution of the current medical and social problem: treatment of patients with degenerative dystrophic lesions of the lumbosacral spine with hernial protrusions of intervertebral disks", one of the most common neurological disorders in the world [6, 8, 9], Fig. 17, 18.

Based on the successes achieved in physics (the discoveries of "evanescent waves", "scanning tunneling microscope", "stationary and non-stationary Josephson effects", the development of highly sensitive equipment [3, 12, 15]) and the author's discovery of this highly informative, non-invasive, harmless method of studying the mechanism of physical factors action on the whole organism from any part of the skin surface: "the spectrobiopsy of the blood", on which the entire picture of the organism is reflected [6, 7, 8, 9, 10], the new theory creation for the mechanism of physical factors action on the supramolecular level of the whole organism with the "tunnel effect" became possible.

Keywords— *physio-dynamics, physio-kinetics, supramolecular structures, blood spectrum biopsy. Introduction (Heading 1)*

Immediately after administration every pharmacological drug is subjected to complex physicochemical changes with subsequent formation of reversible and irreversible compounds (intermediates) during all the route inside. In order to continue cyclic operation of transit from one state to

another till elimination from integral organism, determined energy is released certainly.

It is commonly known that two aspects of drug-body interaction are studied: drug influence on body (pharmacodynamics) and body influence on it (pharmacokinetics). Pharmacodynamics studies localization, mechanism of action and pharmacological effects of drug substances.

Pharmacokinetics deals with regularities of absorbance, distribution and elimination of drug substances in animal and human organisms [5].

However, it will be noted that speed, scale, content and duration of drug intermediate formation are individual for every patient.

According to pharmacokinetics and pharmacodynamics, prior to implementation in medical practice, all drugs interacting with organism must be studied by fast, safe and highly informative methods.

Observation of this conception provides high therapeutic effect, primary and secondary prevention of diseases, prevention of complications and side effects. Due to absence of drug research methods at supramolecular level, it is disregarded in global medical and pharmaceutical practice.

Every externally administered substance is a foreign body for organism. Thus, fast disposal system is activated immediately. It may be referred to own patient's blood beyond blood stream. In other words, it is instant conversion of activity of all organs and systems in improper operating mode.

It will be noticed that in modern medical science there are no test methods related to determination of cyclic temporal level of every system in the moment of drug effect on human body, in transient states at supramolecular level and after re-entry of all systems into normal operating mode.

In this regard, it is difficult to imagine an advantage of one or another drug substance and, in particular, to consider these factors for a given patient. Lack of facts concerning drug way toward its goal in chronological sequence discredits advantages of drug therapy over physiotherapy.

It is known that "energy" is a final characteristic of every drug substance at supramolecular level. It is

difficult to measure and regulate it in therapeutic goal. It leads to absence of these characteristics in global medical and pharmaceutical reports.

Energy effect of every physical factor is measured and regulated (physio-dynamics) with the aid of nanotechnologies. In terms of physio-kinetics, energy route can be traced to every molecule of integral organism without violation of supramolecular structures and negative sequelae.

Such high control of drug substance route in organism is not observed in modern global pharmaceutical science.

According to A.L. Chizhevsky, "electric" exchange (basis of metabolic process) is an essential condition for living body existence; general energy content in cellular structures has a strictly determined value" [13].

Human biopotential is an individual value both in normal and abnormal states. Thus, every disease causes biopotential deviation in every patient correspondingly to stage (i.e. formation of intermediate conditions with determined violation of supramolecular structures).

Therefore, it determines clinical presentation in the moment of examination. Also, it is a critical factor for every medical specialist to choose appropriate therapeutic approach in order to associate disease regression with recovery of affected supramolecular structures excluding new major violations at all levels of integral organism.

This conception is not a main principle of drug therapy due to lack of highly informative study methods related to purity, dose and mechanisms of drug action at supramolecular level.

Clinical physiotherapy is closely related to other branches of medicine, physics and biology.

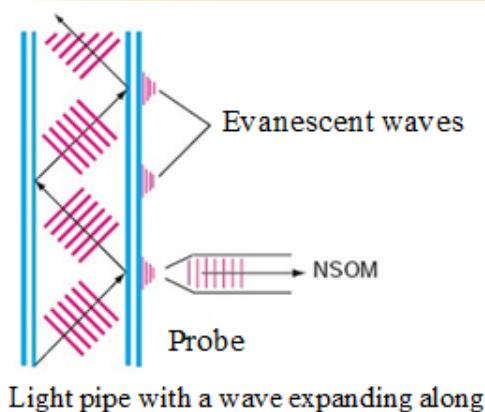
Thus, revelation of etiology and pathogenesis of many diseases enables both usage of required physical factor and development of reasonable technique to use and combine it with other physical factors [11, 17, 18, 25].

In virtue of gains in physics and development of highly sensitive equipment, it is possible to define mechanism of action of low-power physical factors at cellular and subcellular levels [2, 14, 16].

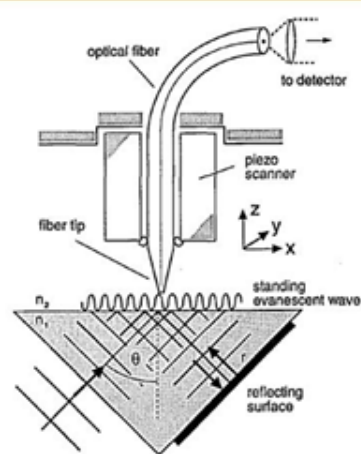
It is found that due to transmission of any electromagnetic wave along a light pipe, surrounding evanescent waves usually form. Perpendicularly directed to external surface of a light pipe, they decay with distance.

Not long ago scientists from Japan, USA, Ukraine and Korea discovered these previously unknown properties of light [3].

That is why we performed several experimental investigations (such as record of stationary evanescent wave photons on skin surface after exposure of polychromatic visible and infrared polarized light (480-3400 nm)).



Measurement design of light wave state expanding along a light pipe. Discontinuous evanescent waves are localized near surface of a light pipe. Properly, it is a near field region. Few near field photons can be transformed into measurable signal by means of NSOM probe.



Record design of photons related to a stationary evanescent wave attributed to upper surface of prism by means of scanning tunnel photon microscope.

Fig. 1. Evanescent waves.

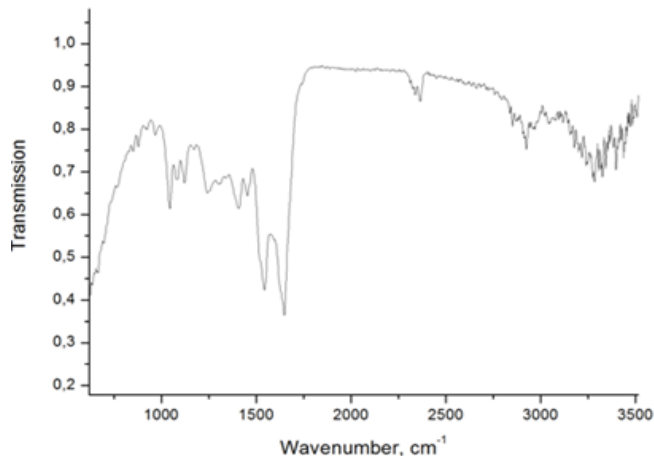


Fig. 2. Skin IR-spectrum after yellow light exposure to arm by means of optical fiber cable for 10 minutes.

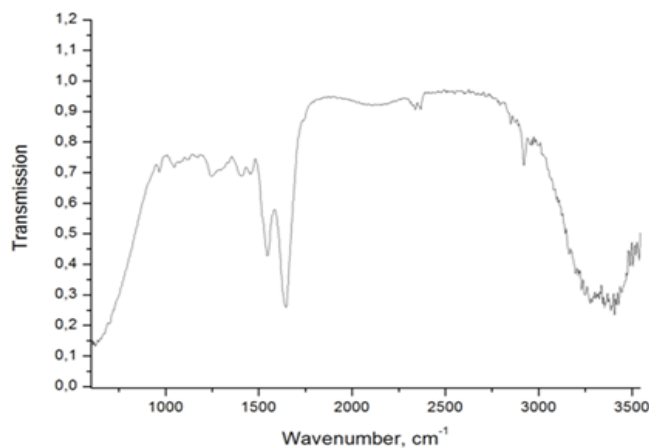


Fig. 3. Skin IR-spectrum after submergence of arm exposed by yellow light via optical fiber cable for 10 minutes.

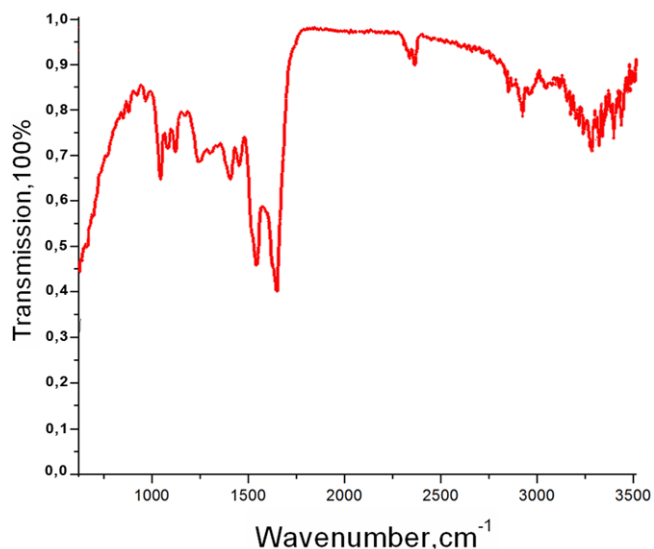


Fig. 4. Skin IR-spectrum after exposure of polarized light (Bioptron apparatus) to arm for 10 minutes.

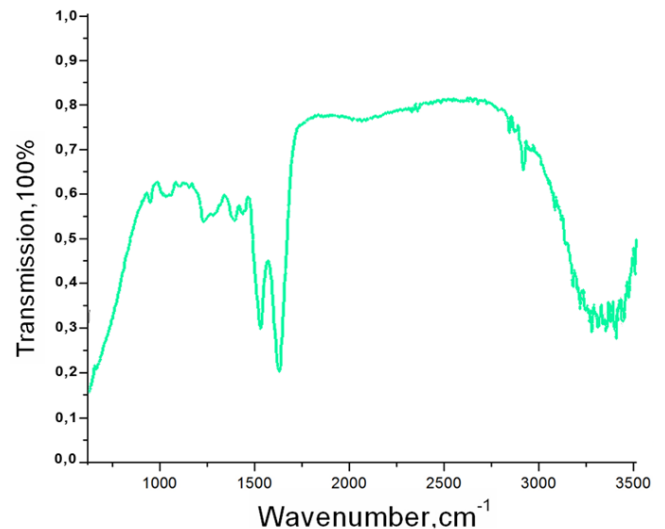


Fig. 5. Skin IR-spectrum after submergence of arm exposed by Bioptron light for 10 minutes.

It is found that evanescent infrared skin spectra (obtained after exposure of water activated by light via Bioptron optical fiber cable) demonstrate increase in absorption area regarding several spectral ranges ($3200-3500\text{ cm}^{-1}$ and $<800\text{ cm}^{-1}$). Thus, hydration growth is observed [6, 7, 8, 9].

In this regard, there is every reason to use Bioptron phototherapy via optical fiber cable both for direct and indirect (water) exposure for treatment of various diseases of locomotor apparatus and skin, as well as other organs and systems.

Based on experiments mentioned above, inference should be drawn that water photoexcitation with Bioptron really causes change in water structure. It is possible due to water absorbance of source irradiation stimulating growth of hydrogen-bonded water nanoclusters. It is caused by detection of unusual light properties (evanescent waves) by scientists mentioned above and creation of "scanning tunnel microscope". Stefan Mendach and his German colleagues created working instrument which can recreate two-dimensional pictures of three-dimensional nano-sized objects by means of light of visible frequency and near IR-spectrum. This device is based on "superlenses" consisted of thin tube-shaped silver bands. Central hole is about $2\text{ }\mu\text{m}$. From inner surface of the tube evanescent waves perpendicularly directed to circle transmit outside through all its layers. Primary image magnification is observed during this process (i.e. "scanning tunnel microscope") [3].

In 1982 "increase in transmission of laser (or other) emission through soft turbid physical and biological media" was experimentally proved by Gurgen Ashotovich Askar'yan (Russian scientist, laureate of the Lenin Prize for Physics) [4].

It is generally known that one interesting laser application is based on stimulating action on regenerative, anti-inflammatory and immune processes in cells and tissues. Especially, it is caused by resonant behavior of absorbance and stimulation (one of absorbance areas is close to generation line of He-Ne-laser with wavelength of 0.63 μm).

That is why these lasers are used to treat purulent processes of maxillary sinuses, trophic ulcers, non-healing wounds, stomatitis, polyneuritis and other pathological processes.

In this regard, we used low power lasers widely in combined therapy of trophic prolonged non-healing wounds (in average, 150-170 patients annually) according to following method:

1. magnetotherapy of affected limb (5-7 min, <30 mT) and transversely to wound area (5-7 min, <30 mT) (Polus-1);
2. ultratone therapy (ultrasonic currents) of wound area; mean power, 10 min;
3. laser therapy: 4 zones (wound perimeter-wise), consistently for 4 min each, 1500 Hz; 5th zone (center of a wound) - consistently for 4 min, 80 Hz.

Treatment course - 17 procedures.

Stable remission and complete wound healing were observed in all cases.

Over the last five years at the average 180 patients with bilateral purulent process of maxillary sinuses were treated in Department of Physiotherapy according to following regimen:

1. UHF-therapy of maxillary sinuses (40 W, 10 min, treatment course - 10 days);
2. short-wave UV-irradiation of nasal passages (40 s, 10 days);
3. laser therapy of maxillary sinus areas and soft tissues above nasal sinuses with moderate irradiator pressure (Uzor-A-2K) (5 Hz, 5 min, treatment course - 10 days).

Clinical recovery was always observed under X-ray control of paranasal sinuses. So, surgical intervention was not required.

In the first experiment author used foam layer to simulate highly diffusing medium. Full-time working He-Ne-laser (LG-75) was used (15-20 mW). Its beam struck upon tested layer squeezed by cylinder or tube. A diffuse light spot was recorded by a camera as it left scattering layer. This spot depends on thickness of compressed layer. The smaller is thickness of compressed layer, the bigger is diffuse light spot on the exit [4].

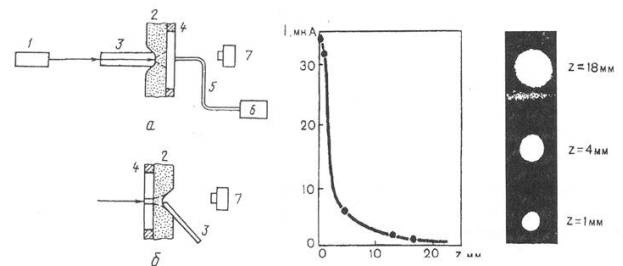


Fig. 6. Increase in light penetration due to pressure on foam layer.

In the second experiment G.A. Askar'yan studied change of light penetration through human tissues. Palm was used as a scattering layer. He-Ne-laser beam struck upon its center. Thickness of central part of a palm was 2.7 cm; 2 cm due to weak painful compression.

Sharp enhancement of light transmission was observed due to beam incidence on back of the right palm and pressure on opposite side of palm flesh with a glass rod. Enhanced light transmission from opposite side was caused by left palm pressure on a plexiglass cylinder whereby light was transmitted. This event was observed even when compression was 2.7-2.0 cm. Thus, palm pressure causes significantly greater bleaching effect than foam use [4].



Fig. 7. Increased light penetration due to pressure on biological body layer.

Picture of light penetration enhancement through a hand:

a - a palm pressed by a glass rod. Beam is on external side. Sharp enhancement of light penetration is visible in pressured area;

b - external side. Unpressured palm, no light transmission;

c - external side. Left palm is pressed to a plexiglass cylinder whereby light is transmitted. Significant enhancement of light transmission intensity is observed.

The author associates it with side displacement of blood and tissues. However, it will be noticed that in frames of this experiment even thicker palm parts (bloody flesh or phalangeal region) are more exposed to pressure lucency than its central part. Lucency relaxation is a matter of interest. Disappearance of pressure does not cause immediate disappearance of lucency. Pressure trace permits light through for 1-3 s more. After-effect of lucency is proved by several reports [6, 7].

Some reports [7, 8, 9, 10] established that cardiovascular, nervous and lymphatic systems may act as light pipes with surrounding formation of evanescent (discontinuous) waves directed perpendicularly to external surfaces of blood vessels, capillary tubes and nerve roots due to specific exposure of electromagnetic waves on every skin area. Consequently, evanescent IR-spectroscopy of attenuated total reflection caused by IR-fiber impact is unique non-damaging approach without required special skin preparation (i.e. "blood spectrum biopsy" presenting complete body picture at supramolecular (atomic) level) (figs. 8, 9, 10, 11, 12, 13).

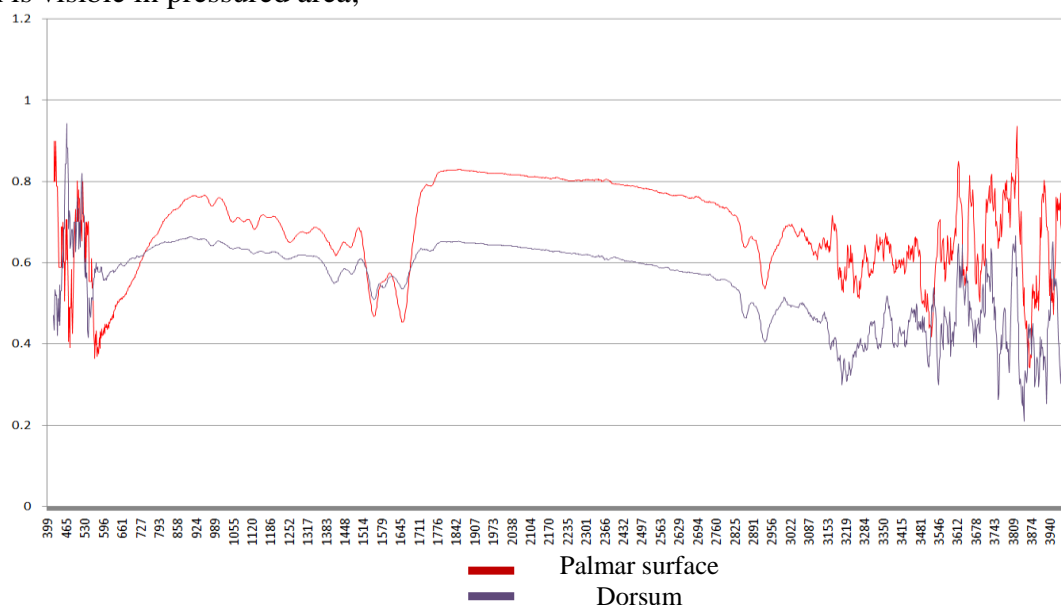


Fig. 8. Blood spectrum biopsy (non-irradiated hand surface).

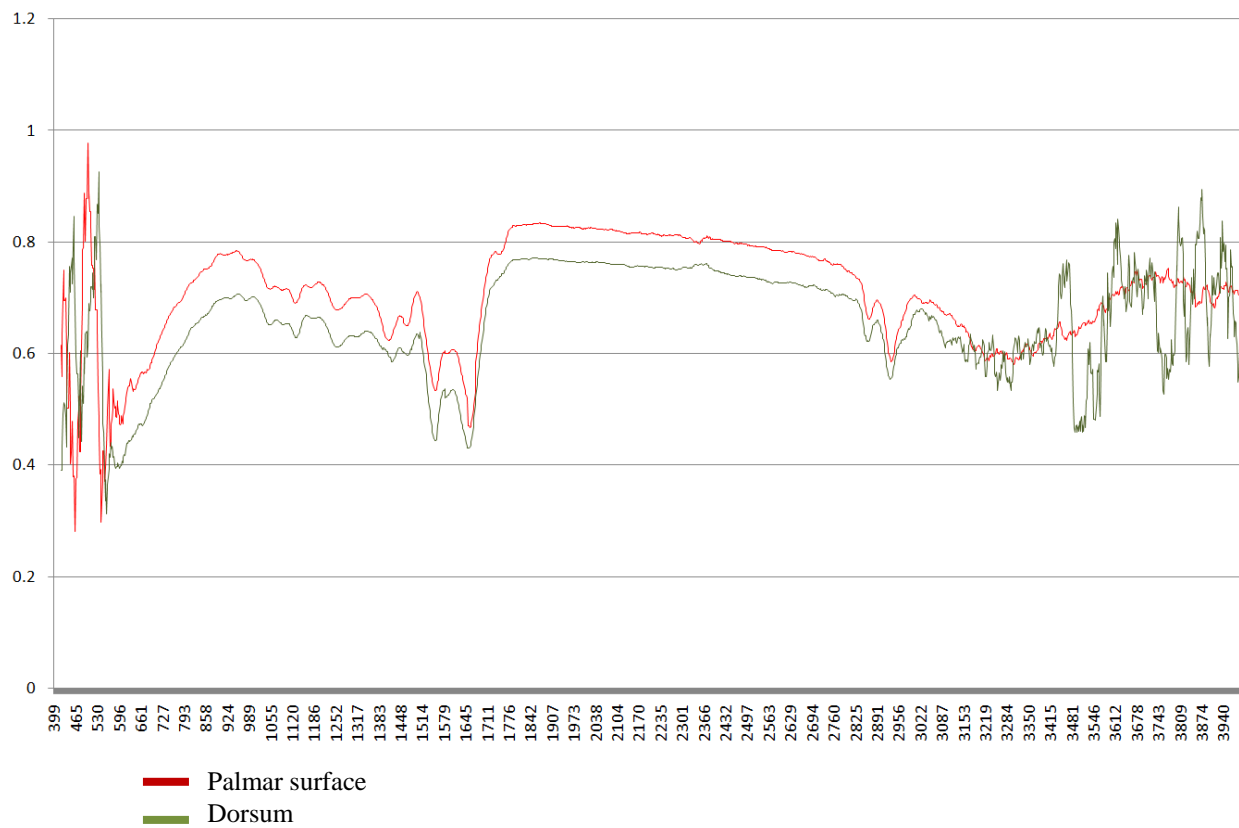


Fig. 9. Blood spectrum biopsy (hand surface irradiated with yellow light for 10 min).

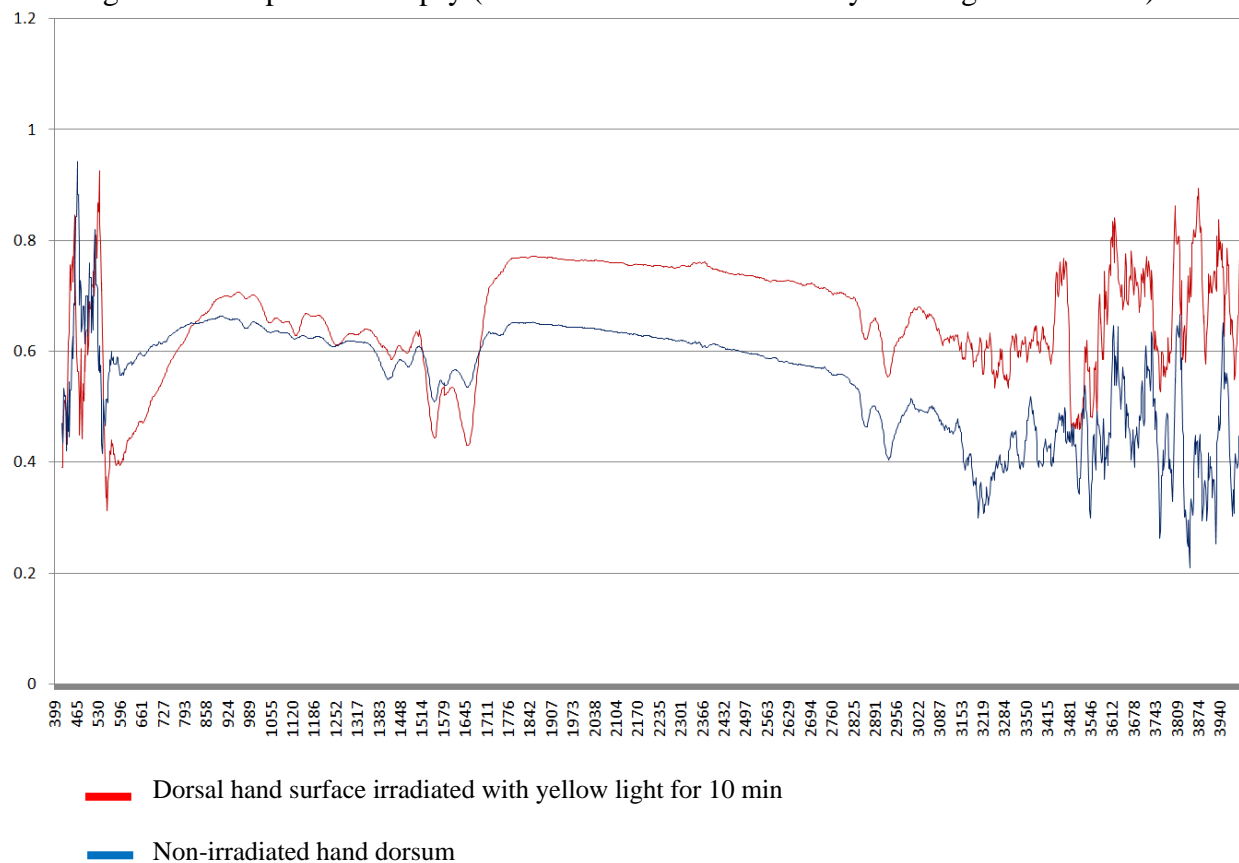


Fig. 10. Blood spectrum biopsy (hand surface).

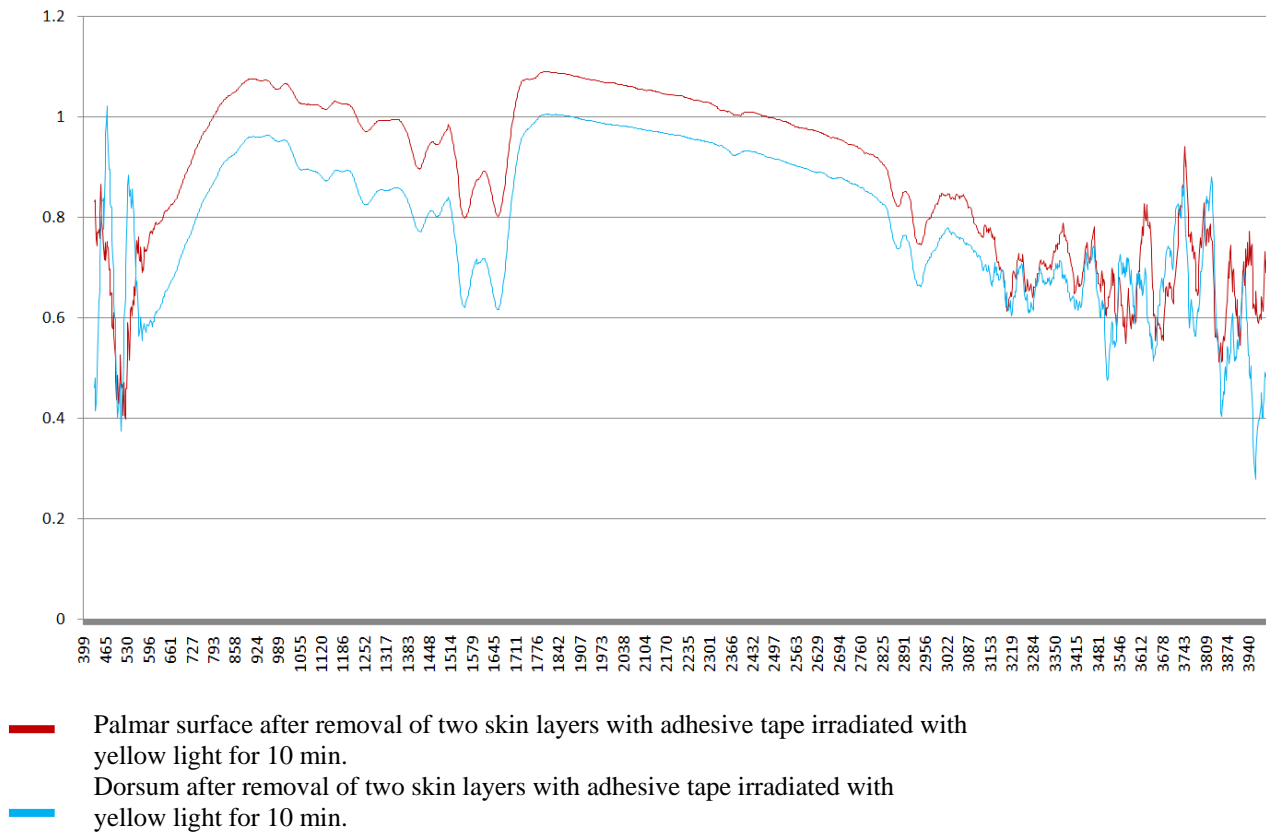


Fig. 11. Blood spectrum biopsy (hand surface).

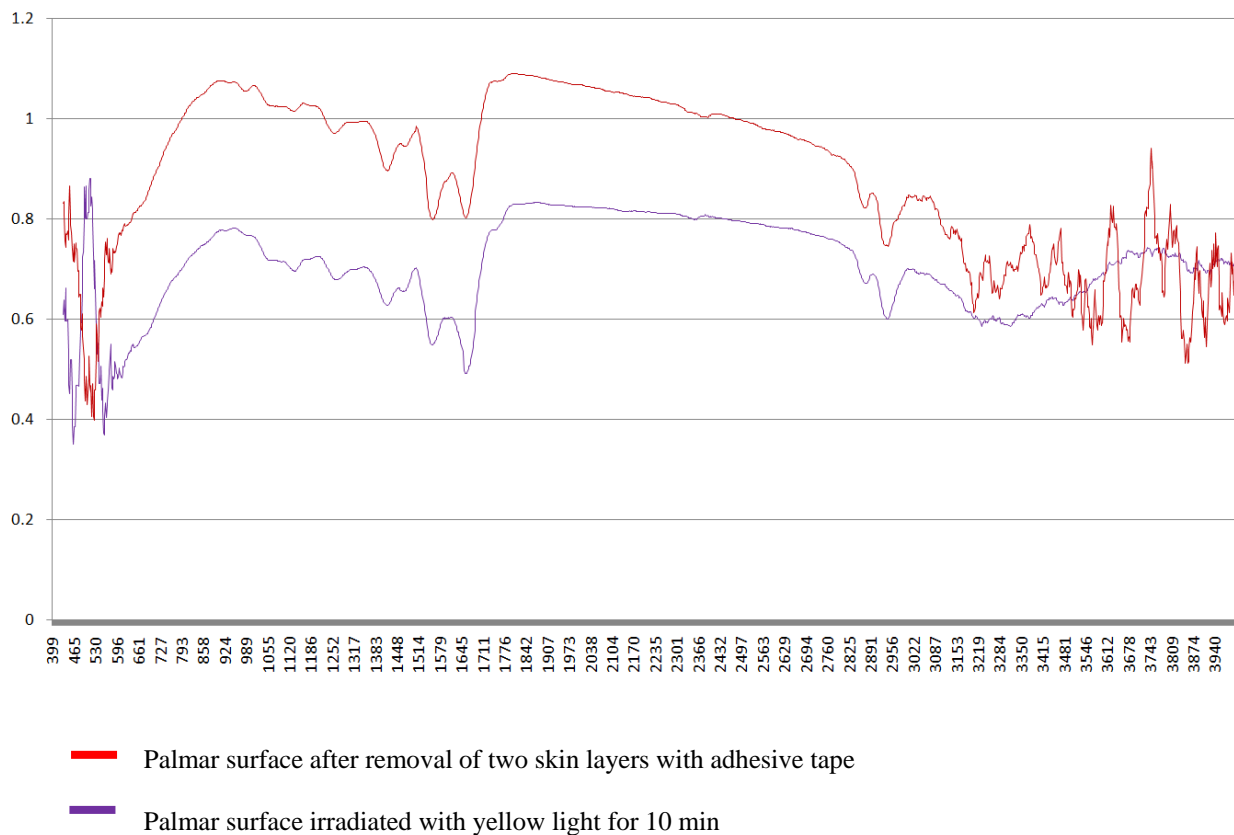


Fig. 12. Blood spectrum biopsy (hand surface).

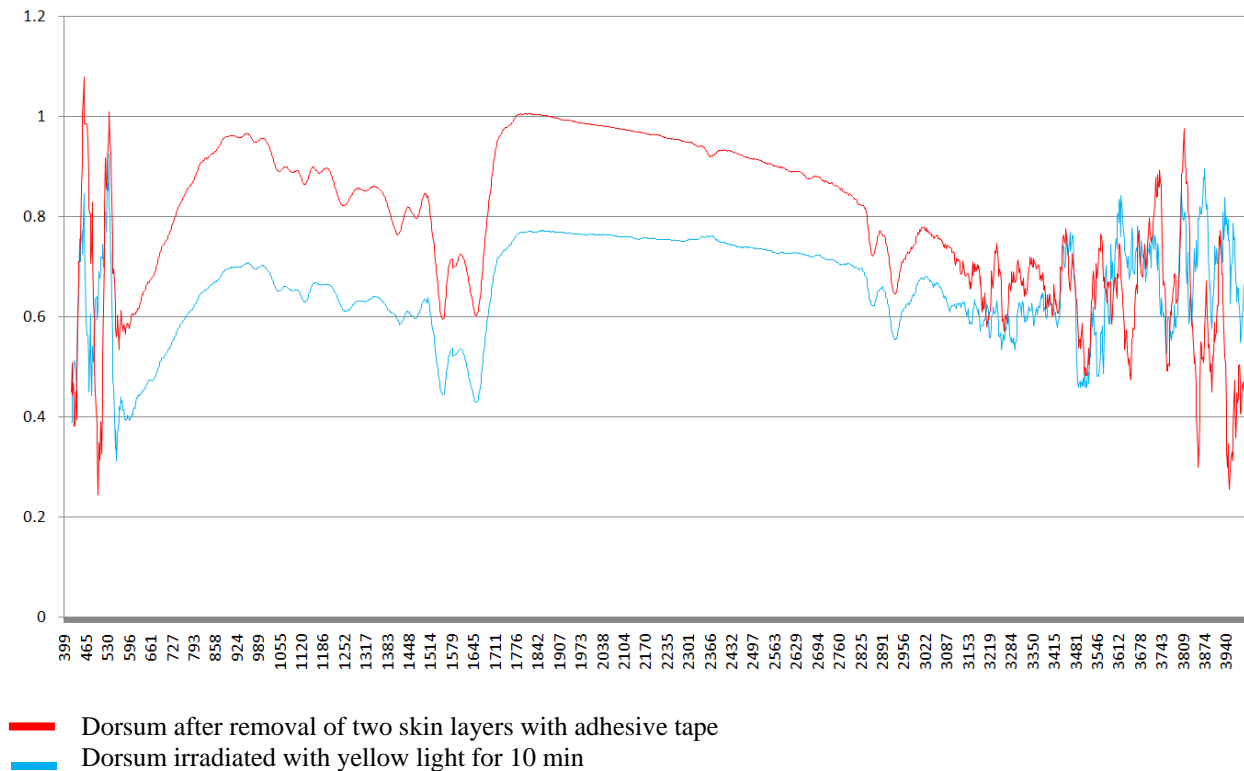


Fig. 13. Blood spectrum biopsy (hand surface).

Subsequent to results of experiments, it is arguable that our conception is proved by G.A. Askar'yan's experiments concerning "increase in transmission of laser (or other) emission through soft turbid physical and biological media". In particular, it is related to fact that integral organism responds to all external actions on the principle of "biological scanning tunnel microscope". Thus, light transmission through all palm thickness is not related to side displacement of blood and tissues (as is argued by author of experiment), as well as layer-by-layer formation of evanescent waves within a palm is not connected with their subsequent increase on its opposite side. Conclusion made by author of experiment also supports our conception. Namely, pressure of a palm causes rather more significant bleaching effect than foam use. Even thicker palm parts (bloody flesh or phalangeal region) are more light-permeable and exposed to pressure lucency than its central part.

Our conception of tunnel effect appearance in integral organism due to exposure of low power electromagnetic waves is proved by reports of Russian and foreign authors. Causes of evanescent wave occurrence were revealed by Professor Zhizhin German Nikolaevich (Doctor of Physics and Mathematics), Professor

Vinogradov Yevgeny Andreevich (Doctor of Physics and Mathematics), Galynsky V.N., Furs A.I., Barkovsky L.M., etc. They consider that polaritons are resulted from interaction of photons and medium elementary excitations. Interaction of electromagnetic waves and medium excitations (phonons) resulting in their connection is very strong when their frequencies are coincident with wave number vectors (i.e. resonance). Bound waves are formed there, i.e. polaritons on border of two media exponentially decrease depending on distance from interface (near field). Phonon is a quasiparticle introduced by Igor Tamm (Russian scientist). It represents oscillatory motion quant of crystal atoms.

Scientists detected pseudoparticles traveling on the surface of light-sensitive materials.

As a part of team-work with scientists from Fritz Haber University (Berlin, Germany) and Aalto University (Helsinki, Finland), researchers from Karlsruhe Technological Institute took a significant step towards realization of technologies to transform light into energy potentially suitable to use for good of people [2, 13].

Process modifying light energy into other energy types, gradually become a basis of

technologies which will supply humanity with energy in the nearest future.

"Transformation of energy of photons and light particles into electric energy has several stages", explains Professor Cristof Weil (Head of IFG Institute). "Firstly, surface of light-sensitive material absorbs light. Due to exposure of light photon energy, electrons abandon their places leaving electron holes behind with whom they immediately form quasiparticles (termed as polaritons). Life of these polaritons is very short. They transfer to material borders and disintegrate on electrons and holes which continue to transfer alone. Now afterlife of these charge carriers depends on nature of used light-sensitive material" [20].

It is known that in 1962 B. Josephson (English physician) predicted stationary and nonstationary effects in superconductor-dielectric contact based on BCS superconductivity theory.

Two superconductive layers separated by negligibly thin isolator layer (several atoms in thickness) will act as a single system.

When current (not greater than critical value) is transmitted through a contact, there is no decrease in contact voltage (regardless of dielectric layer).

This effect is caused by transmission of conduction electrons through dielectric without resistance due to tunnel effect. Electrons can overcome barrier even without voltage (cooper pair tunneling). This effect was termed as "stationary Josephson effect" [15].

In case of continuous voltage on either side of transmission, quantum mechanics predicts that cooper pairs of electrons will transfer across barrier (initially, in one direction and then in backward one). As a result, alternate current is occurred with frequency increasing according with voltage growth. This effect was termed as "nonstationary Josephson effect" [12, 15].

According to physical laws, formation of evanescent waves in external side of all capillary tubes, blood vessels, nerve trunks and roots is caused by exposure of electromagnetic waves on integral organisms. These are multiple "scanning tunnel biomicroscopes". Exposure of polychromatic visible and infrared polarized light on organism is recorded by means of "scanning tunnel photon microscope" (see fig. 1) (Fermi-Pasta-Ulam phenomenon related to reverse return of energy).

That is why animal organism must be considered as a single superconducting system functioning as per Josephson effect in superconductors.

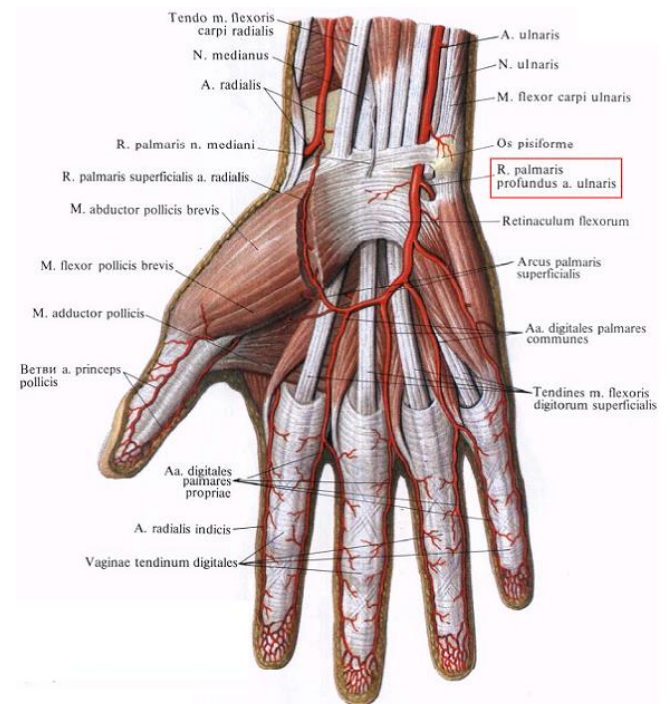


Fig. 14 Arteries of right hand.

In this regard, weight of evidence confirms that we detected new, previously unknown exposure mechanisms of weak electromagnetic waves on integral organism and approaches to record body response reactions. So, integral organism works according to principle of "scanning tunnel near field biomicroscope", as far as it corresponds with description of Stefan Mendach's device (Germany).

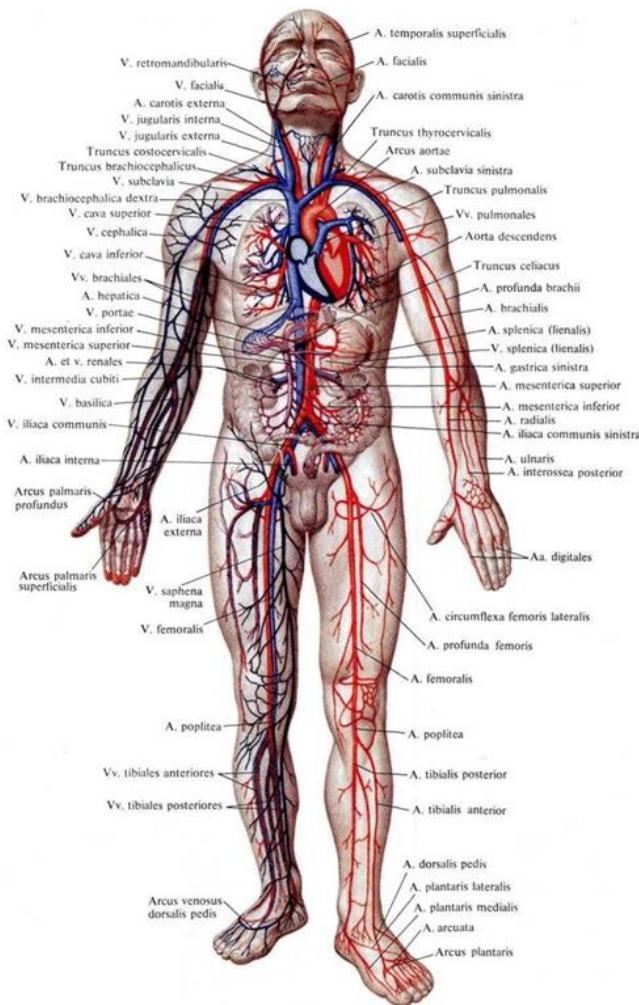


Fig. 15 Venous and arterial systems.

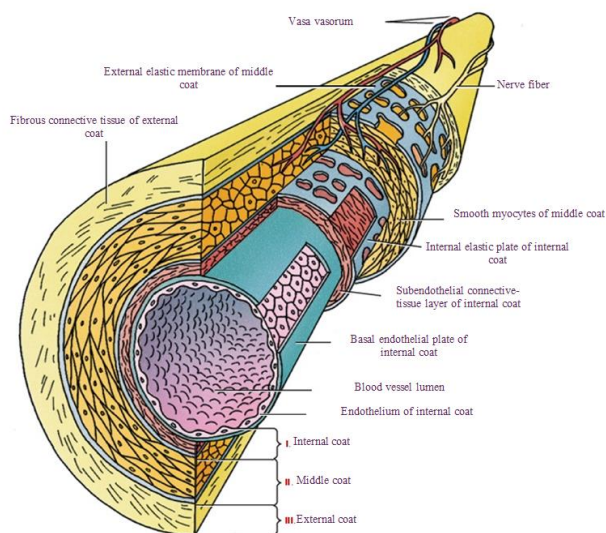


Fig. 16. Structure of blood vessel wall.

Cardiovascular, nervous and lymphatic systems may act as light pipes with surrounding formation of evanescent (discontinuous) waves directed perpendicularly to external surfaces of

blood vessels, capillary tubes and nerve roots due to exposure of electromagnetic wave on every skin area. Thus, integral body starts to function as "scanning tunnel microscope". Consequently, evanescent IR-spectroscopy of attenuated total reflection caused by IR-fiber impact is unique non-damaging approach without required special skin preparation (i.e. blood spectrum biopsy presenting complete body picture on supramolecular (atomic) level). It is a new progressive branch of medicine. [7, 8, 9]

International Biological Team discovered natural compound which has delayed ageing in healthy mice. This research was published in Cell Metabolism and EurekAlert (10/28/2016). Scientists consider that NAD (nicotine-amide-adenine-dinucleotide) deficiency appears along with ageing. Due to NMN (nicotinamide mononucleotide), researchers succeeded in significant delaying of physiological decaying; in aging mice. As a result, their metabolic levels were approximately equal to values of young animals [22, 24].

Scientists suggest that these impressive results can be also actual for humans.

Testing of NMN drugs on human subjects has already begun in Japan. Researchers managed to use NMN nucleotide involved in energy cellular metabolism for synthesis of NAD coenzyme in animal organism. It is impossible to administer NAD directly to animals. Due to DNA damage, NAD synthesis cools down with advancing age. Mice tests testified that water-soluble NMN soaks into blood within 3 minutes with subsequent transformation into NAD in tissues. Professionals note that NMN administration has no effect on young mice. According to scientists, this compound (NMN) is contained in several food products (in particular, in broccoli, cabbage, cucumbers and avocado). Metabolism is regulated by NAD and NADP coenzymes [19, 22, 24].

NADP is a recovered NAD-derivative undertaking hydrogen and electrons of oxidizable compound with subsequent transfer to other substances.

According to Washington University researchers, NMN activates genes responsible for production of determined proteins (sirtuins). Increased concentration of these proteins in organisms of experimental rodents caused significant delay of age-related visual degradation and metabolic processes [1, 19, 24].

It will be also noticed that modern ideas of cellular process regulation enable to put an increased focus on nitrogen oxide with polyfunctional physiological action. This free radical can provide both activating and inhibitory effects on various metabolic processes in organisms of humans and mammals [22, 24].

In 80s intensive study of NO biological effect started. R. Furchgott and J. Zawadzki showed that acetylcholine-induced dilation of blood vessels is occurred only in presence of endothelium (endothelial cells covering internal surface of all vessels).

Substance released by endothelial cells in response to acetylcholine or other external impacts causing vessel dilation (like in researches of Professor Samoilova K.A.) was termed as "vasodilating endothelial factor" [22, 23, 24].

Soon after it was proved that this substance is NO gas and cells have special enzyme systems to synthesize it.

In organisms of humans and mammals nitrogen oxide is mainly produced as a result of oxidation of L-arginine aminoacid guanidine group with simultaneous synthesis of another aminoacid (citrulline) caused by NO-synthase enzyme. This enzyme was termed as "synthase" (instead of "synthetase") because ATP energy is not required for its activity [1, 22, 23, 24].

Nowadays three following cell populations are the best known to synthesize and release NO: endothelium of blood vessels, nerve cells (neurons) and macrophages (connective tissue cells with high phagocytic activity). In this regard, three main isoforms of NO synthases (NOS) can be traditionally distinguished such as neuronal, macrophagic and endothelial ones (specified as NO synthase I, II and III, respectively). Neuronal and endothelial enzyme

isoforms constantly present in cells (termed as constitutive ones). The second isoform (macrophagic) is inducible (i.e. enzyme is synthesized as response to determined external impact on a cell [1, 19, 22]).

In this regard, it should be emphasized that the second macrophagic isoform (NOS) is synthesized under exposure of polychromatic visible and infrared polarized light (480-3400 nm) according to Professor Samoilova K.A. Also, there are reasons to perform fundamental researches concerning detection of increase in isoforms I and III caused by exposure of polychromatic visible and infrared polarized light because, according to our researches, this light provides immediate impact on cardiovascular system and full coverage of integral organism [7, 8, 9, 10].

Professor Samoilova K.A. confirms that two light-absorbing enzyme complexes with oxidative properties (nicotine-adenine-dinucleotide-phosphate-oxidase (NADP-oxidase) and nucleotide-containing bioprotein-NO-synthase) play the key role in stimulating action of optical irradiation on cells and tissues. Due to action of visible and IR-light, these enzymes localized in cellular membrane activate, use surrounding oxygen and produce its active forms (ROI) such as superoxide anion, hydrogen peroxide, hydroxyl radical and nitrogen oxide (NO). In particular, these high-reactive molecules conduct light signal from surface to core of irradiated cell influencing on special intracellular mechanisms of activation signal conduction.

It has been already established that formation of nitrogen oxide (NO) in systemic circulation is the key mechanism of such effects related to visible and IR-light as dilation of blood vessels and platelet disaggregation which are essential for high-effective phototherapy [23].

Prior to consider actual examples of NO biological activity in humans and animals, it will be noticed again that its multifunctional activity cannot be reduced to only "beneficial" or "negative" effects [19, 22, 24].

Biological response to NO is significantly determined by generation conditions (site, time

and amount of production of this compound) [1, 22].

It will be noticed that following characteristics are insufficiently studied nowadays: localization, NO-synthase distribution, non-enzymatic formation of nitrogen oxide, NO involvement in nerve system regulation and immune protective responses, NO participation in activity of central nervous system (CNS) and role of nitrogen oxide as a regulator of cellular processes in formation of multiple organ failure.

Based on the above, we need to confirm that it is necessary to enhance fundamental researches based on academic research institute with the assistance of specialists trained in physics, chemistry, cytology, physiology, biology and optical physics, as a first step, to create methodology with further research into the topic and program concerning delaying of living organism natural ageing.

Conceptions mentioned above are proved by new recovering technology (Underwater Horizontal Spinal Elongation with Underwater Phototherapy) with high statistical accuracy. It is aimed to solve such actual medical social problem as treatment of patients with degenerative dystrophic disorders of lumbar-sacral spinal region associated with hernial protrusions of intervertebral disks. It is one of the most common neurological abnormalities in the world.



Fig. 17. Apparatus of underwater horizontal spinal elongation with underwater phototherapy via optical fiber cable.

At the present stage of regenerative medicine development wide range of drug and non-drug methods (such as physiotherapy, tractional and manual therapy, reflexotherapy and exercise therapy), as well as surgical (operative) treatment are used to treat this patient cohort.

In addition, we do not obtain desirable therapeutic effect of used methods due to inefficiency of their combined use [11, 17, 18, 25].

Our system (Combined Use of Underwater Horizontal Spinal Elongation with Underwater Phototherapy via Optical Fiber Cable) can provide recovery of disordered functions in 96-98% of patients with degenerative dystrophic spinal disorders due to decrease in hernial protrusion of intervertebral disks by 30-50% and anti-inflammatory antioxidative action of underwater phototherapy. However, up to the present moment this complex has not been used to treat this pathology anywhere in the world.

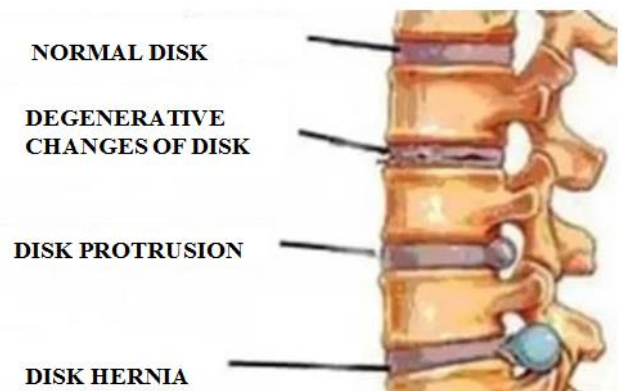


Fig. 18. Degenerative dystrophic spinal changes.

Additionally, repeated appealability is only 0.5% within 5-7 years. After the first procedure pain disappearance is observed in all patients. It is a consequence of unique combination of underwater horizontal spinal elongation and underwater phototherapy via optical fiber cable (yellow and IR-light, 480-3400 nm) [6].

Accuracy of therapeutic results is proved by modern high-sensitive informative methods related to evaluation of intervertebral disk status (such as MRI and CT) and *abnormal morphologic processes (blood plasma spectroscopy and blood spectrum biopsy of skin surface; these methods were used for the first time in global medical practice)* [5, 9].

It will be noticed that presented regenerative technology exceeds all existing pharmaceutical drugs and non-drug therapeutic methods taking deserved leading place *in primary prevention of degenerative dystrophic spinal disorders in adolescents, sportsmen, drivers of highway, railway and other types of transport where duration of driver labor is more than 60 min per day.*

There are no analogues in global medical practice.

We consider that high efficiency of anti-inflammatory, immunomodulatory, antiviral and antitumor actions of polarized light (480-3400 nm) is confirmed by fundamental researches of Russian and foreign scientists such as Professor Samoilova K.A. (Doctor of Biology, Cytological Institute of Russian Academy of Sciences, Saint-Petersburg, 2003); Professor Gerasimova L.N. (Doctor of Medicine, Burn Center of Sklifosovsky Research Institute of Emergency Ambulance, Moscow); Professor Khan M.A. (leading pediatric physiotherapist in Moscow, Doctor of Medicine, Russian Scientific Center of Regenerative Medicine and Balneotherapy of Ministry of Health of the Russian Federation, Moscow); Professor Lenz M. (Oxford University, Great Britain); Professor Medinica L. (Dermato-Venerologic Institute of Clinical Center, Belgrade University, Yugoslavia) [6, 10].

Rapid "disappearance" of pro-inflammatory cytokines (tumor necrosis factor (TNF α) and interleukins (IL-6, IL-2, IL-12) from circulation even in 30 minutes after the first irradiation is a feature of phototherapy with polychromatic visible and infrared polarized light. By the end of treatment course initially increased TNF α decreases by a factor of 30, IL-8 - 4-6 times smaller, IL-2 - 4-10 times smaller and IL-12 - 12 times smaller. Anti-inflammatory cytokines (IL-10) and transforming growth factor (TGF- β_1) increase in blood plasma simultaneously. The most important interferon- γ immunomodulator (IFN- γ) rapidly increases by a factor of 6, even in case of initially normal level. The most important function of this cytokine is activation of cellular immunity (functional status of monocytes, macrophages, natural killers and cytotoxic T lymphocytes), primarily, increasing antiviral and antitumor resistance [23].

In vitro experiments related to blood irradiation with polychromatic visible and

infrared polarized light give ground to connect all effects mentioned above with direct light exposure on blood. In all experiments light not only supports but also regulates cytokine content.

Also, there is direct in vivo contact with cardiovascular system (blood) by means of perspiration.

It is instant exposure at cellular or supramolecular (atomic) levels [8, 9, 10].

In this regard, we can confirm that underwater horizontal spinal elongation with underwater phototherapy deserves fast implementation in practical work of regenerative medicine centers, medical exercises dispensaries, health resort institutions, rehabilitation exercise departments in treatment and prevention institutions and care homes for primary prevention of adolescents/sportsmen and improvement of life quality of patients with degenerative dystrophic spinal disorders.

Man is a part of Nature. Thus, all biological processes are performed according to strict "program" and the stringent echelon (from elementary particles till complex structures) [7, 8].

There are no two similar elementary particles in Nature: from supramolecular structures composed of them till the Cosmos. Based on example of living body in every system (muscular, circulatory, nervous, cardiovascular etc.), there are no two similar cells considering neither content nor form. Otherwise, there would be no muscular contraction, pulse transmission, intra- or intercellular movement. It would be full absence of visible life-sustaining activity (i.e. superslow movement at supramolecular level). But in this perception our possibilities are limited with range of human knowledge [8, 9].

Intracellular structure of every system is inimitable. Thus, intracellular energy is inimitable too. That is why intercellular energy difference exists. It is a source of continuous infinite movement with wide infinite speed range. It causes cyclic processes of "medium-energy" transmission from one state to subsequent ones. A doctor should consider this fact in prescription of drug therapy. Otherwise, it can lead to various complications and drug addiction (organ and system dysfunction, development of drug addiction/allergy) [8, 9, 26].

It is known that "in 80s term "radiation hormesis" was introduced in biology. In terms of

homeopathy, large doses of radiation cause unfavorable effects on living bodies (such as inhibition of cell division, growth and development). In the other hand, small doses stimulate practically all physiological processes". Effects related to stimulating effect of small radiation doses were termed as "radiation hormesis" [21].

In this regard, we consider that therapeutic exposure of every physical factor on human body is carried out via specific "receptor". In terms of therapeutic effect, nature of this physical exposure is less significant than exposure power according to radiation hormesis.

Weak physical exposures are more selective. Very accurate correction of their parameters is required to perform interaction causing recovery of damaged specific biological process [8, 9].

Selective correct method related to physical factor use for given intermediate state of integral organism during cyclic abnormal development involves refuse from high-power parameters of selected physical factor. It is necessary to prevent simultaneous destruction of intermediate cyclic states of weakened morphological supramolecular body structures and potent abnormal supramolecular ones. It is gross interference in biological cyclic processes in organism.

It may cause total or partial irreversible states of integral body organs and systems. In this regard, we will confirm that administration of "disease-related established drug standards" in all patients with the same diagnosis is antiscientific and highly dangerous.

Every disease is inimitable for given patient due to etiology, pathogenesis, clinical presentation, disease outcome and future sequelae for integral body because there are no two similar germs in Nature.

Conclusions

1. It has been established that the effect of electromagnetic waves of any physical factor on the entire organism is dosed and controlled by modern physiotherapy instrumentation.
2. It has been established that "blood spectrobiopsy" is a simple highly informative non-invasive method for studying the mechanism of physical factors action on the supramolecular

level of an integral organism from any part of the skin surface.

3. It has been established that etiology, pathogenesis, clinical stage of development and outcome for each human are individual and unique. In this regard, the use of "established drug standards for diseases" for all patients with the same disease is antiscientific and extremely dangerous.

4. It has been established that the new system of the rehabilitating technology of underwater horizontal spinal traction with underwater phototherapy through the fiber-optic cable surpasses all existing pharmacological methods and other non-medicinal methods of treatment and is therefore recognized as one of the leading methods of primary and secondary prevention of degenerative-dystrophic spine lesions. There are no analogues in the world medical practice.

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