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Study of the Whole Organism with Pathology of The Musculoskeletal System at The Supramolecular Level – A New Direction in Medicine

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Abstract

This technology promotes "unloading" of intervertebral discs, increasing diastasis between the articular surfaces of intervertebral and peripheral joints, has a positive effect on spasmodic muscles, causing their relaxation. Stretching of the joint capsule during traction and simultaneous photo exposure normalizes microcirculation in encapsulated foci of inflammation, which has an anti-inflammatory effect and normalizes impaired innervation of the limbs, reduces and reduces pain syndrome. Every year the number of patients increases, signs of these diseases (osteochondrosis of the spine and deforming osteoarthrosis of the hip and knee joints) are increasingly found even in children aged 12-15 years.

Key words: pathology; knee joints; muscles; reduces pain syndrome

Introduction:

This work is devoted to a highly effective method of treating musculoskeletal pathology through the combined use of modern modifications of underwater traction and underwater phototherapy developed by the author. This technology promotes "unloading" of intervertebral discs, increasing diastasis between the articular surfaces of intervertebral and peripheral joints, has a positive effect on spasmodic muscles, causing their relaxation. Stretching of the joint capsule during traction and simultaneous photo exposure normalizes microcirculation in encapsulated foci of inflammation, which has an anti-inflammatory effect and normalizes impaired innervation of the limbs, reduces and reduces pain syndrome. Every year the number of patients increases, signs of these diseases (osteochondrosis of the spine and deforming osteoarthrosis of the hip and knee joints) are increasingly found even in children aged 12-15 years. Therefore, based on a large amount of factual material, there is reason to assert the advantage of underwater traction with underwater phototherapy over other methods of conservative treatment of musculoskeletal pathology.

Vertebrogenic pathologies of the nervous system account for more than half of all neurological morbidity: from 60% to 90%. [7,12]

Degenerative-dystrophic processes in the intervertebral discs and the formation of their hernial protrusion are of the greatest

clinical and expert interest. [18]
The issue of treating patients with hernial protrusions of intervertebral discs (HIPID) of the lumbar spine has long gone beyond the scope of a purely neurological problem.
Surgical methods of treating this disease do not always lead to the desired result. [7]
The issue of treating discogenic radicular syndrome remains relevant. Surgical and traditional conservative treatment do not allow in most cases to achieve significant progress in the pathological neurological status. [7, 10, 13]
There is information on the effectiveness of using traction therapy, physiotherapy, acupuncture, manual therapy, exercise therapy; pharmacotherapy in the treatment of compression syndromes. [7,10,11,18]
The scientific study is devoted to a comprehensive study of the dynamics of pathophysiological mechanisms of dysfunction in patients with herniated intervertebral discs of the lumbosacral spine. Its goal was to substantiate a new method of restorative correction of reduced functional reserves of the patient and optimize the results of treatment of discogenic radicular syndrome. Given the low efficiency of conventional methods of treating this category of patients, it is obvious that the identification of new mechanisms of pathogenesis of pathological neurological status is of ongoing relevance.
The goal and objectives of the study are set, the complexity of approaches to their solution by modern medical, physical, biophysical and statistical methods is determined. The novelty of the chosen approach to treatment is based on a new concept shared by an increasing number of researchers of various profiles. It consists in the fact that water, which is part of a living organism, is not just a solvent for various types of molecules and ions, not an indifferent environment in which biochemical reactions occur, but serves as an energy carrier and a source of basic resonant frequencies of all vital biological processes.
Restorative correction of impaired functions in patients with herniated intervertebral discs of the lumbosacral spine can be carried out by combining underwater horizontal traction of the spine with underwater phototherapy (Figure 1).

Figure 1: *Underwater spinal traction device with phototherapy and smooth adjustable spinal traction system*

The analysis of the effectiveness of treatment of 745 patients with degenerative-dystrophic lesions of intervertebral discs aged from 17 to 60 years was conducted. All of them were divided into five groups depending on the method of treatment and age (Figure 2).
Two control groups of 175 and 157 patients were treated with medication and a combination of physiotherapy with medication, respectively.
The main group of 413 patients was treated by underwater horizontal traction of the spine in combination with underwater phototherapy.

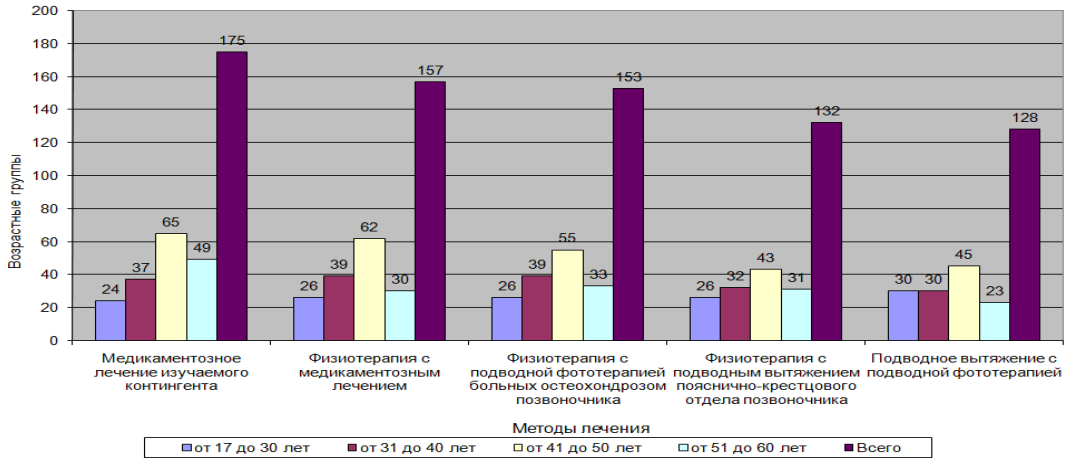


Figure 2: *Distribution of the studied contingent with osteochondrosis of the lumbar spine and by treatment methods and age groups (n = 745)*

Distribution of patients by the size of the herniated disc protrusion into the spinal canal of the selectively studied contingent based on the results of MRI (Figure3).

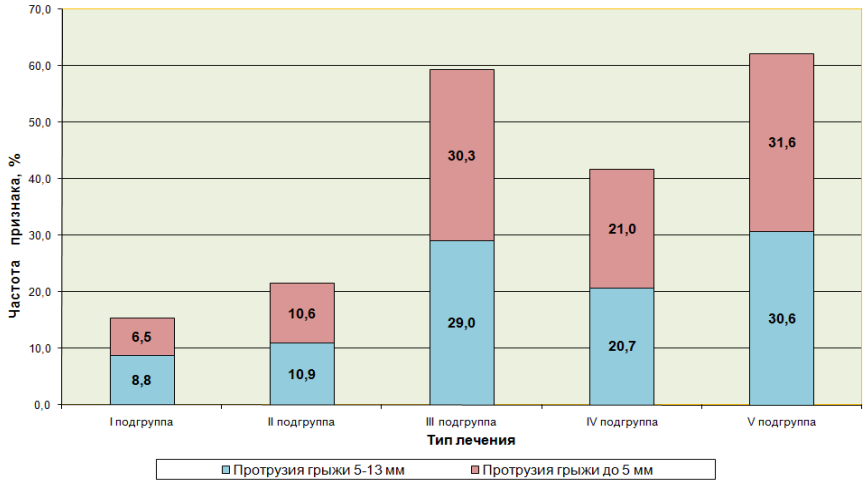


Figure 3: *Frequency distribution of the sample population based on the results of MRI of the lumbosacral spine (n=269)*

According to the subjective method of assessing the intensity of pain syndrome, it was found that the largest number of patients, 197 people, reported constant pain before treatment, which intensified with movement, and only 9 people after treatment. Sharp constant pain was reported by 10 people before treatment, and no one after treatment. No one reported the absence of pain syndrome before treatment, and 240 people reported it after treatment (Figure 4).

Интенсивность болевого синдрома	Число больных			
	До лечения		После лечения	
	Чел.	%	Чел.	%
До 100%	**10**	3,9	-	-
60 – 80%	32	12,3	-	-
40 – 60%	**197**	75,8	**9**	3,5
20 – 40%	21	8,0	11	4,2
0 – 20%	-	-	**240**	92,3
Всего	260	100	260	100

Figure 4: *Results of pain intensity assessment before and after treatment.*

Distribution of the sample study population by MRI results and age groups before treatment and by regression of the GMDD into the spinal canal after treatment (n=269) shows:

The highest percentage of patients with GMDD protrusion both up to 5 mm and from 5 to 13 mm before treatment was the same age group of 41-50 years (37 and 35%), and the lowest was the age group of 51-60 years (18%) and the age group of 17-30 years (14%).

Regression of the GMDD by 30% was the largest number of patients with protrusion from 7 to 9 mm 38 people, the smallest number of patients 5 people with protrusion up to 3 mm. Regression of the IVD GV by 40% comprised the largest number of patients with protrusion also from 7 to 9 mm 28 people, the smallest number of patients 5 people with protrusion from 9 to 13 mm. Regression of the IVD GV by 50% comprised the largest number of patients also with protrusion from 7 to 9 mm 29 people, the smallest number of patients with protrusion from 9 to 13 mm 12 people (Figure 5, 6).

Возраст	Дорсопатия позвоночника, остеохондроз с протрузией ГМПД в спинномозговой канал до 5мм.		Дорсопатия позвоночника, остеохондроз с протрузией ГМПД в спинномозговой канал от 5 до 13 мм.		Всего	
	абс.	%	абс.	%	абс.	%
17-30 лет	16	21,0	27	**14,0**	43	16,0
31-40 лет	18	23,7	48	25,0	66	24,5
41-50 лет	28	**36,8**	67	**34,7**	95	35,3
51-60 лет	14	**18,4**	51	26,4	65	24,2
всего	76	28,2	193	71,8	269	100,0

Figure 5: *Distribution of the sample study population according to MRI results and age groups before treatment (n=269)*

ГВ МПД в спинномозговой канал	Регресс ГВ МПД в спинномозговой канал			Всего	
	На 30%	На 40%	На 50%	Чел.	%
До 3 мм.	**5**	9	15	**29**	**10,8**
От 3 до 5 мм.	6	23	18	47	17,5
От 5 до 7 мм.	22	17	26	65	24,2
От 7 до 9 мм.	**38**	**28**	**29**	**95**	**35,3**
От 9 до 13 мм.	16	**5**	**12**	33	12,2
Всего	87	82	100	269	100

Figure 6: *Distribution of patients by regression of the IVD lesion into the spinal canal after treatment according to MRI data (n=269)*

In support of the above, it is necessary to demonstrate in Fig. 7 the results of MRI of patient M., 33 years old, before treatment on 06/05/06, herniated disc L4-L5 9x13 mm.
Results of MRI after treatment on 12/18/06, herniated disc L4-L5 6.5 mm.

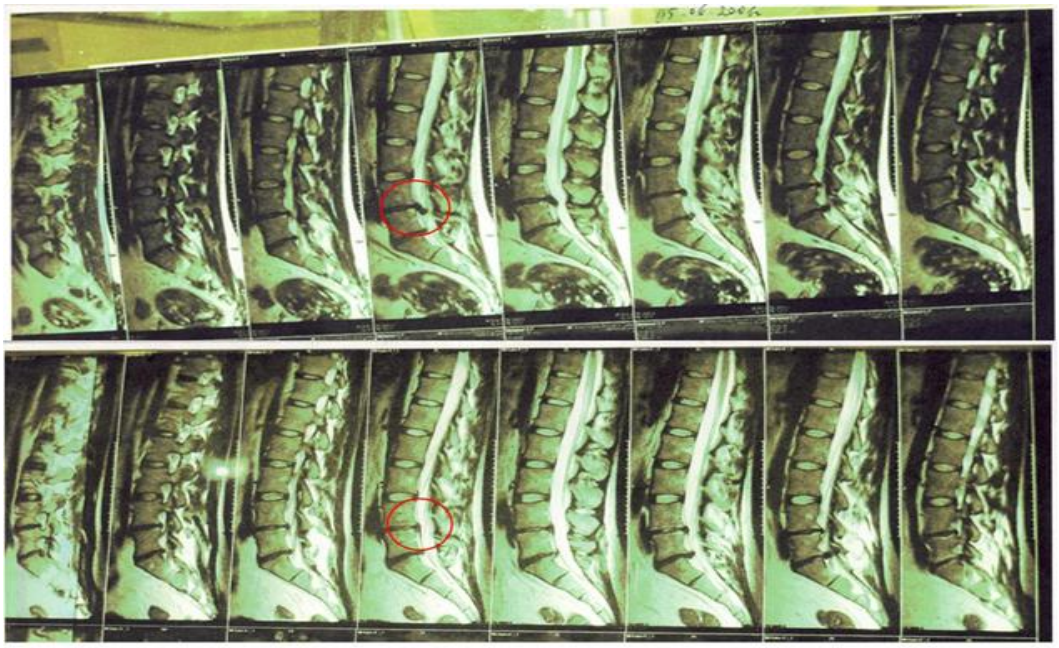


Figure 7: *Results of MRI of the lumbosacral spine of patient M., 33 years old, before and after treatment.*

According to statistical analysis, it was revealed that treatment methods 3, 4 and 5 contribute to the greatest manifestation of

the frequency of the sign, - "improvement - absence of pain syndrome", compared to other types of treatment. The highest frequency of the sign is achieved by treatment type 5; the difference in the frequency of this sign in relation to the frequencies against the background of other types of treatment is statistically significant (Figure 8).

	1	2	3	4	5
1					
2	0,4054				
3	0,0000*	0,0000*			
4	0,0000*	0,0000*	0,0000*		
5	0,0000*	0,0000*	0,0001*	p=,0275*	

Figure 8 : *Results of comparisons of the frequencies of the feature, - "improvement - absence of pain syndrome", in groups of patients who received treatment methods 1-5*

As a result of comparing the frequencies of the feature, “no change – no clinical dynamics” in the groups of patients who received treatment methods 1-5: as can be seen from the table, the lowest frequency of the studied feature was established against the background of treatment with the 5th method, the highest against the background of treatment method 1 (Fig. 9).

	1	2	3	4	5
1					
2	0,1986				
3	0,0020*	0,0667			
4	0,0000*	0,0009*	0,1132		
5	0,0000*	0,0000*	0,0008*	0,0918	

Figure 9: *Results of comparisons of the frequencies of the sign, "no changes - no clinical dynamics", in groups of patients who received treatment methods 1-5*

According to the statistical analysis, it was revealed that of the nine clinical signs studied, more than 90% among all five groups of patients were: symptoms of root tension, radiculalgia, lumbago.

It was also established that treatment methods 3, 4 and 5 lead to a statistically significant decrease in the frequency of radiculalgia compared to both the drug method and the combination of the drug method with physiotherapy (methods 1 and 2).

Analysis of the effectiveness of the treatment methods used allowed us to establish that the method of underwater spinal traction in combination with underwater phototherapy gives the greatest effect. In patients treated with this method, pain syndrome disappeared in 98% with the onset of stable remission, in 2% of patients no changes were observed (there was no clinical dynamics), there were no deteriorations.

The lowest effect was observed in patients in the control group treated with drug therapy. The disappearance of pain syndrome with the onset of stable remission occurred only in 46%, the absence of clinical dynamics - in 34%, and negative clinical dynamics were in 20% of patients.

Such impressive treatment results prompted us to attempt to identify the physical nature of the therapeutic effect of the proposed method. For this purpose, we undertook experiments to study the effect of polarized light of the Bioptron device on water, blood plasma and the whole organism. The studies were conducted in the laboratories of leading institutes of the Russian Academy of Sciences. Their results, obtained with the kind assistance of the employees of these laboratories, I present to your attention:

- IR spectroscopy in the region of 4000-400 cm-1 (on a Perkin-Elmer 2000 Fourier spectrometer between KRS-5 plates) the study was carried out at the A.A. Frumkin Institute of Physical Chemistry and Electrochemistry of the Russian Academy of Sciences;
- Study of Raman scattering spectra of water samples on automated fiber-optic spectrometers (Institute of Spectroscopy of the Russian Academy of Sciences, Troitsk, Moscow Region, Fiber Optics Research Center of the Russian Academy of Sciences, Moscow);

- Evanescent infrared spectroscopy of skin in vivo with a fiber-optic sensor (Fiber Optics Research Center of the Russian Academy of Sciences, Moscow).

Light from the Bioptron was directed either onto the horizontal surface of the water or penetrated into its volume via a fiber-optic cable (Fig. 10, 11).

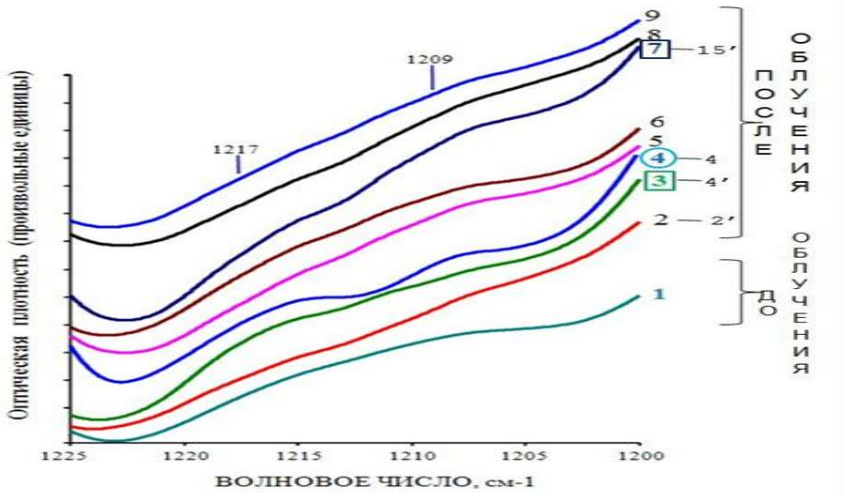


Figure 10: *IR spectra of tap water before and after exposure to polarized light from the Bioptron device.*

The figure shows the IR spectra of tap water before and after exposure to Bioptron light. As can be seen, the maximum change in the absorption spectrum occurs after 4 minutes of water irradiation if it is carried out via a fiber-optic cable and after 15 minutes of irradiation if the source is located above the water. The most significant absorption is achieved when light is applied to water containing carbon dioxide (the fourth curve). The aftereffect of irradiation after 26 and 15 minutes was established.

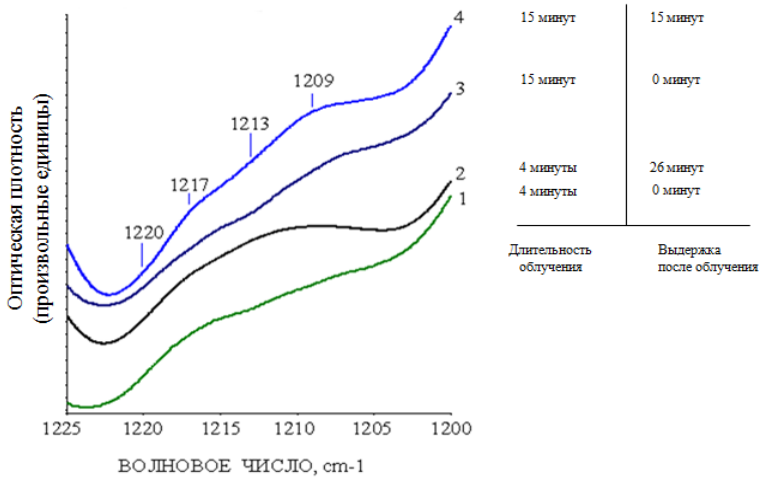
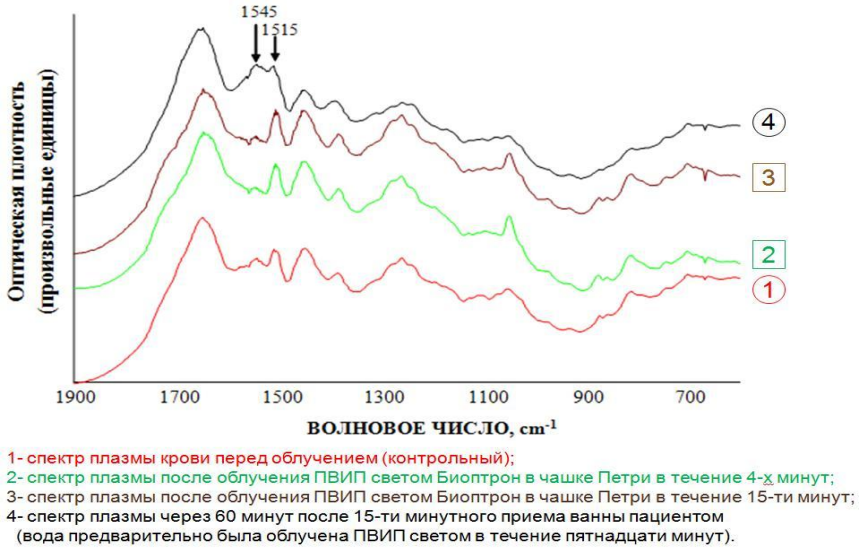


Figure 11: *Section of the IR spectrum of tap water after exposure to Bioptron polarized light*

A similar effect was also observed when studying the blood plasma of a volunteer, when, one hour after a 15-minute bath in water that had been previously irradiated for 15 minutes, it was discovered that the blood plasma taken from the volunteer absorbed light much more strongly than the control plasma (Fig. 12).



1- спектр плазмы крови перед облучением (контрольный);
2- спектр плазмы после облучения ПВИП светом Биоптрон в чашке Петри в течение 4-х минут;
3- спектр плазмы после облучения ПВИП светом Биоптрон в чашке Петри в течение 15-ти минут;
4- спектр плазмы через 60 минут после 15-ти минутного приема ванны пациентом
(вода предварительно была облучена ПВИП светом в течение пятнадцати минут).

Figure 12: *IR spectra of blood plasma after exposure to polarized light from the Bioptron device*

Thus, the effect of the polarized light of the Bioptron produces changes in the structure of water and blood plasma that are stable for at least an hour.
The results of our study of the Raman spectra of water complement the results obtained during the analysis of the absorption spectra (Fig. 13).

Namely, the following appear in light-irradiated water:

- bands of valence vibrations at frequencies of 3100 cm-1 - 3300 cm-1;
- bands of deformation vibrations at lower frequencies, including hydrogen bonds with frequencies below 200 cm-1;

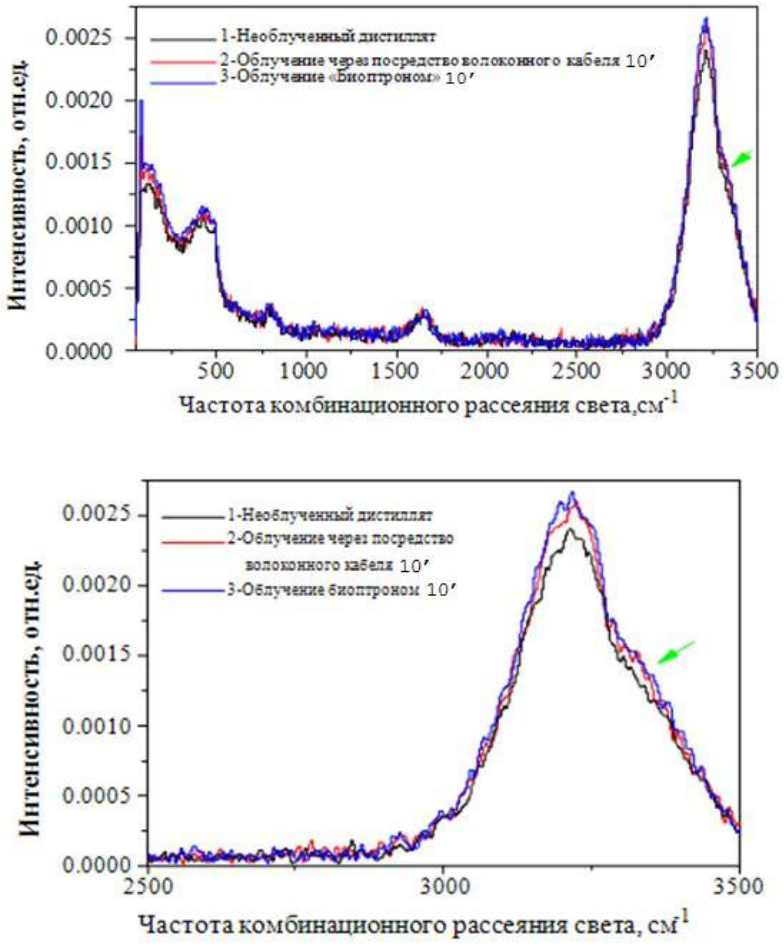


Figure 13; *A section of the Raman spectrum of tap water after exposure to polarized light from the Bioptron device and through a fiber cable for 10 minutes.*

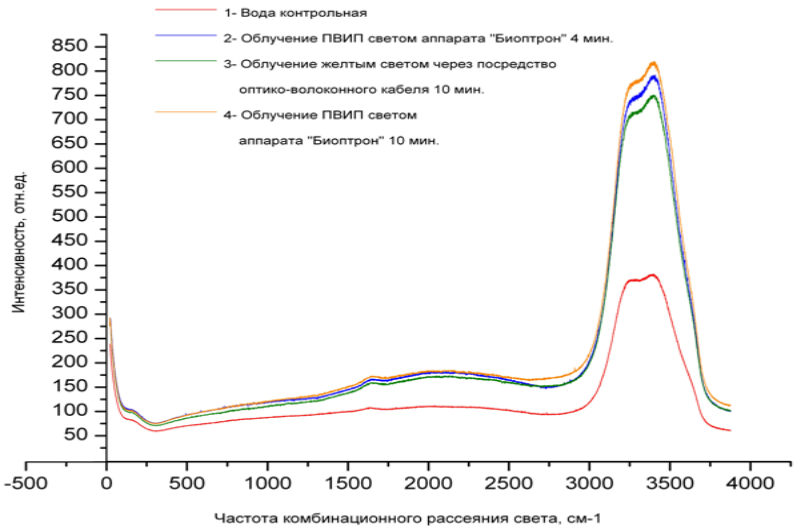


Figure 14: *Raman spectrum of tap water after exposure to polarized light of the Bioptron device and through a fiber cable for 4 and 10 minutes.*

Rational use of physical factors in the complex therapy of patients follows the principle of strictly differentiated selection of the type of energies used, their sequence of implementation in full compliance with the clinical picture. [5]

The clinical picture of any nosological form of the disease for a specific patient is represented by an absolutely individual range of symptoms, as a result of a complex etiopathogenetic process, depending on a variety of negative internal and external factors. Although today doctors have thousands of pharmacological drugs, most of them are either not effective enough or have side effects. Physical factors (low intensity) not only do not cause allergic reactions, but also have an antiallergic, immunocorrective effect. [5]

Cells have the ability to process a clearly limited amount or a certain range of energy of any physical factor into their specific biological process. Energy that goes beyond the perceiving range in the direction of increase (individual for all types of cells), the cells are blocked and pass by (a more favorable option) or are subject to destruction when breaking through the cellular protective block. Maximum energy in an infinitely small space is a danger of destruction, and the maximum space with a minimum of energy at each point is a characteristic of life evolution (A. Zalmanov, 1991).

This concept makes it possible to:

Study the leading characteristics - frequency, wavelength, power, cyclicity of cell bioenergy in norm and pathology.

Determination of the degree of disorders of specific biological processes of organs and systems.

Selection of therapeutic physical factors (type of energy, parameters, individual technique, course of treatment) to restore the disordered biological processes.

In our opinion, due to the fact that diseased cells are not able to accept and transfer such intense energy into their specific biological process, it is possible and this is one of the sources of the pathological process of complications and side effects, it can also unbalance other organs and systems.

Since, the truly acting and perceiving energy on a living cell is presented with minimal characteristics of the physical factor in relation to the whole organism, and at the cellular level it is presented as an intensive therapeutic effect. [4, 10]

In Nature, there are no two identical elementary particles, and therefore, consisting of them from subcellular supramolecular formations to the cosmos itself. This is the main condition for the eternal infinite constant movement and eternity of the Universe [6].

Using the example of a living organism in any system (muscular, circulatory, nervous, cardiovascular, etc.), there are no two identical cells either in content or in form, because there would be no muscle contraction, impulse transmission, intracellular, intercellular movement, i.e. a complete absence of vital activity [5,6].

A person is a complex nonlinear system consisting of a large number of different functional structures. The nervous, endocrine and impulse systems maintain information balance in the body, modeling and compensating signal effects on each other. The concept of "communicative-regulatory integrative apparatus, acting in two ways: conductive, during electrical signal transmission (nerve cells) and humoral, based on the transport of various bioregulators (nerve, mesenchymal and epithelial cells)" has been formed [7, 8, 14].

The intracellular structure of any system is unique, therefore, the intracellular energy is also unique. Therefore, there is a difference in intercellular energy - a source of constant endless movement with a huge, infinite range of speeds, which creates the cyclicality of the processes of transition of "matter-energy" from one state to another. This is the eternal existence of the Universe, but in its cognition our capabilities are limited in the range of human knowledge [6].

One of the founders of plant physiology, Julius von Sachs, in 1892 spoke out with harsh criticism of the already generally accepted cell theory, which was based on studies of dead plant tissues. Sachs proposed replacing the concept of "cell" with the concept of "Energida". According to Sachs, "... the energida is a nucleus associated with its protoplasm so that the nucleus and the protoplasm surrounding it form an organic whole, both morphologically and physiologically. The name "Energida" should

emphasize the main property of this structure - the endowment with an internal active force, if desired, a vital force..." The energida organizes cellular organelles around itself and builds a cellular periphery containing actin and mitochondria, providing its protection from external factors and the exchange of matter and information with the environment [2, 15, 16].
In his book

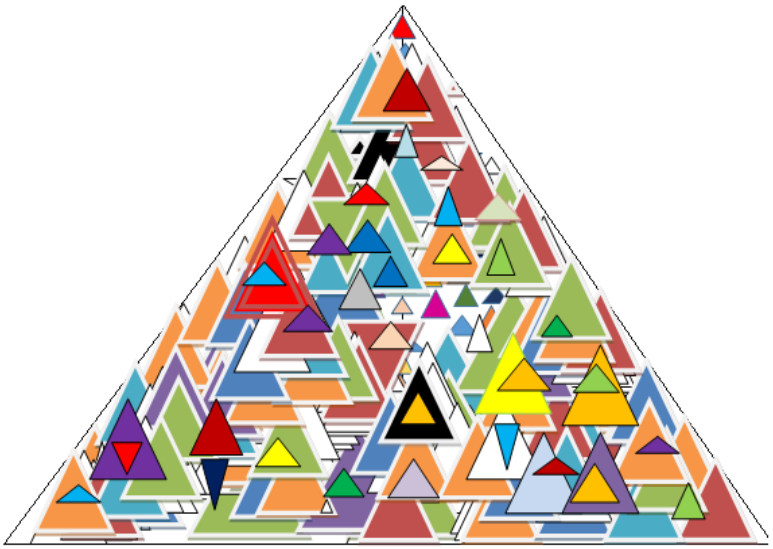


Figure 15: *The law of eternity of the Universe.*

In this regard, we believe that the experiments of G.A. Askaryan on "increasing the passage of laser and other radiation through turbid physical and biological environments confirm our concept that the whole organism reacts to any external influences according to the principle of a "biological scanning tunnel microscope", i.e. the passage of light through the entire thickness of the palm is not associated with the displacement of blood and tissue to the sides, as the author of the experiment claims, but the formation of evanescent waves layer by layer in the thickness of the palm with their subsequent increase at the exit of the opposite side of the palm. Also in favor of our concept is the conclusion of the author of the experiment that the effect of enlightenment when pressing the palm is much stronger than when using foam rubber, and even thicker parts of the palm - the pulp with blood, the area near the phalanges of the fingers are more permeable to light and are more susceptible to enlightenment by compression than its central part. Our concept of the emergence of a tunnel effect of a whole organism when exposed to low-energy electromagnetic waves is supported by the works of domestic and foreign scientists. They revealed the causes of the emergence of evanescent waves: Doctor of Physical and Mathematical Sciences, Professor German Nikolaevich Zhizhin, Doctor of Physical and Mathematical Sciences, Professor Evgeny Andreevich Vinogradov, V.N. Galinsky, A.I. Furs, L.M. Barkovsky and others. They believe that polaritons are formed during the interaction of photons and elementary excitations of the medium. The interaction of electromagnetic waves with excitations of the medium (phonons), leading them to coupling, becomes especially strong when their frequencies and wave vectors coincide (resonance). In this region, coupled waves are formed, i.e. polaritons at the interface of two media and exponentially decrease with distance from the interface (near field). A phonon is a quasiparticle introduced by the Russian scientist Igor Tamm and is a quantum of vibrational motion of crystal atoms.
Scientists have discovered pseudoparticles traveling along the surface of photosensitive materials. Researchers at the Karlsruhe Institute of Technology, working with scientists from the Fritz Haber Institute, Berlin, Germany, and Aalto University, Helsinki, Finland, have made a significant step towards realizing technologies for converting light into energy that can be used to benefit humans [20].
Processes that convert light energy into other forms of energy can and are gradually becoming the basis for technologies that will supply humanity with energy in the near future.
"The conversion of photon energy, particles of light, into electrical energy occurs in several stages," explains Professor Christoph Well, head of the IFG Institute. "First, light is absorbed on the surface of a light-sensitive material. Under the influence of the photon energy of light, electrons leave their places, leaving electron holes in their place, with which they immediately form quasiparticles called polaritons. These polaritons exist only for a very short time, moving to the boundaries of the material, where they disintegrate into electrons and holes, which continue to move further independently. And the further fate of these charge carriers depends on the nature of the light-sensitive material used" [20].

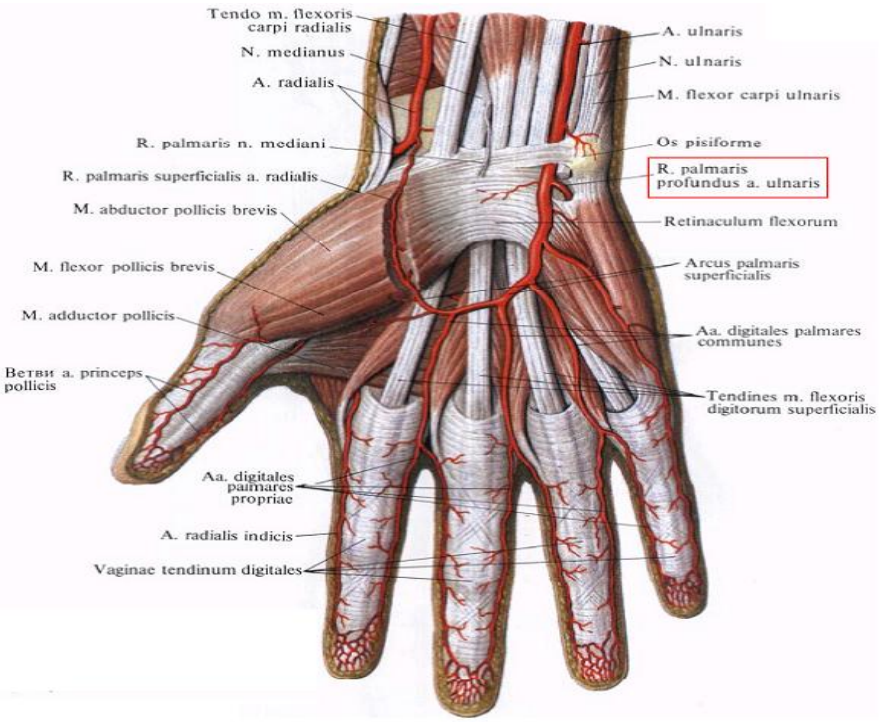


Figure 16: *Arteries of the right hand.*

In this regard, there is reason to assert that we have identified new, previously unknown mechanisms of the impact of weak electromagnetic waves on the whole organism and methods for recording the organism's response. That is, the whole organism functions according to the principle of a "near-field scanning tunnel biomicroscope", as they correspond to the description of Stefan Mendek's device from Germany

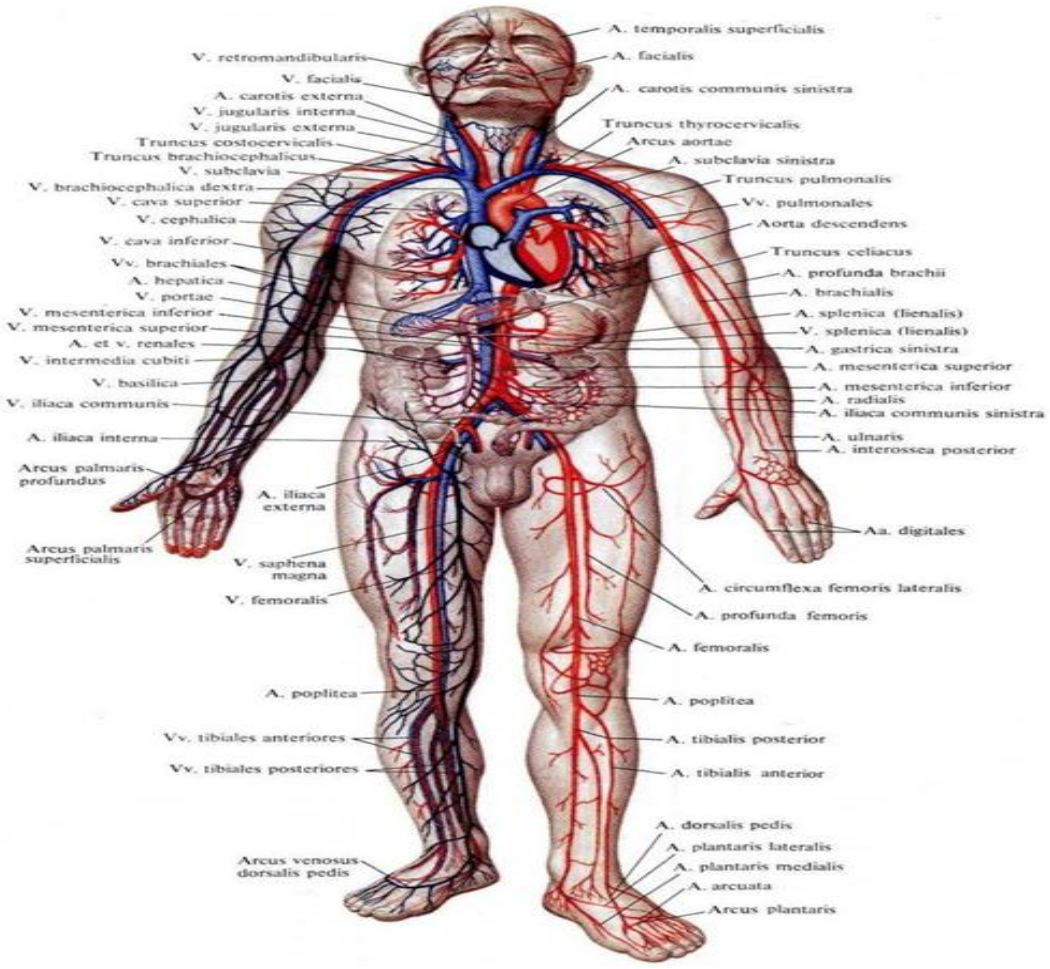


Figure 17 : *Venous and arterial systems.*

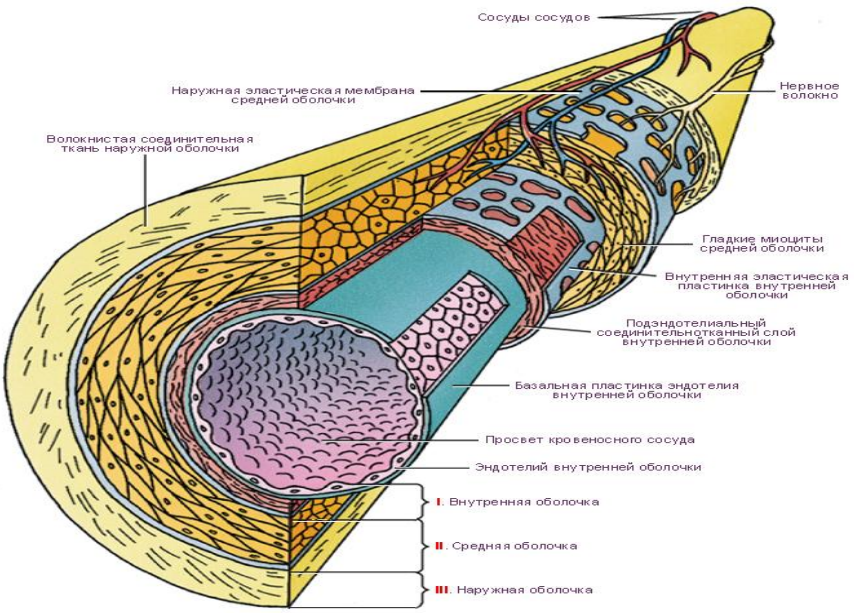


Figure 18: *The structure of the vessel wall.*

Conclusions:

1. It has been established that water promotes a sharp increase in the transmission of light into the human body through the skin, i.e. the use of yellow light through a fiber-optic cable and PVIP light by the Bioptron device through water is more effective.

2. It has been revealed that the use of yellow light in underwater phototherapy by means of a fiber-optic cable is not inferior in effectiveness to PVIP light from the Bioptron device and is significantly superior in cost.

3. New, previously unknown mechanisms of the effect of weak electromagnetic waves on the whole body and methods for recording them have been revealed. That is, the whole body consists of many "scanning tunneling near-field biomicroscopes", and the results of the effect of PVIP light on the body are recorded using a "scanning tunneling photon microscope".

4. Experimentally proved the possibility of studying organs, systems and the whole organism by infrared spectroscopy (Fig. 1, 2, 3, 4, 5), which is progress in rapid diagnostics and effective treatment of patients, also by this method proved the essence of secondary biological radiation (evanescent waves in organs, systems and the whole organism function on the principle of a nano-microscope).

5. Infrared spectra are distinguished by great individuality and this determines their value in identifying and studying the structure of compounds.

This was confirmed by the results of our experimental studies (Fig. 1, 2, 6, 7, 8, 9).

6. It is known that according to the Bouguer-Lambert-Beg law, the amount of a substance is judged not by individual absorption bands, but by spectral curves as a whole in a wide range of wavelengths. Which is the confirmation of our concept of studying the whole organism by infrared spectroscopy (NIR), where morphological changes of all organs and systems are reflected (Fig. 6, 7, 8, 9).

This is the basis for continuing fundamental research in this area and introducing it into medicine, since infrared spectroscopy is widely used to analyze mixtures and identify pure substances.

7. It has been established that the identification of pure substances is carried out using information retrieval systems by automatically comparing the analyzed spectrum with the spectra in the computer memory.

And in this regard, we have the right to conduct fundamental research in medicine on a broad front to create control standard spectra of morphological, functional changes in organs and systems in their cyclic processes for diagnostics at the supramolecular level.

And on this basis, to develop a methodology for determining the optical characteristics of biological systems and the whole organism in norm and pathology to create a spectral data bank. Similar to the one developed by Doctor of Chemical Sciences A.S. Gordetsov's unique, unparalleled, highly accurate method of screening and differential diagnostics of diseases - infrared spectroscopy of blood serum (IRSBS). This opens up wide possibilities in tracking the pathological process and timely

intervention for sharply slowing down the development of pathology and its direction towards healing, especially in oncology.

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