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We present you the results of their researches.

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COMPREHENSIVE TREATMENT OF OSTEOARTHRITIS PEFORMANS WITH CONCOMITANT METABOLIC SYNDROME

Abstract. *Osteoarthritis peformans is the most common pathology of the musculoskeletal system. OAP, combined with metabolic syndrome (MS), leads to an overuse of the knee joints operation, and is one of the main causes of premature disability in people. Combined treatment using electrophoresis with neocaripasin in patients with OAP and concomitant MS reduces pain, the severity of inflammatory responses and improves quality of life.*
Keywords: *deforming osteoarthritis, metabolic syndrome, complex treatment.*

Introduction. Osteoarthritis peformans (OAP) is the most common form of joint disease: 10-12% of the population suffer from it, and regarding a significant aging of the population, it is becoming an increasingly topical disease. Currently, osteoarthritis peformans is seen as a systemic metabolic disease, which is a part of metabolic syndrome (MS). Metabolic syndrome is a pathological condition which is characterized by the development of abdominal obesity, dyslipidemia, hypertension and carbohydrate metabolism disorders (insulin resistance phenomenon). The treatment of osteoarthritis peformans is a complex problem that does not always lead to positive results [1-5].

Objective: to evaluate the effectiveness of comprehensive treatment of patients suffering from osteoarthritis performans of the knee with concomitant metabolic syndrome.

Materials and methods. Group of observations included 60 patients (38 women, and 22 men), aged between 50 and 70, suffering from OAP (the second and third radiologica stages) with concomitant metabolic syndrome. The patients were divided into 2 groups according to the method of treatment. The patients from the first group (30 people) received nonsteroidal anti-inflammatory drug (NSAID) - meloxicam at a dose of 15 mg every day once a day and chondroprotector as a drug piaskledine 300 – 1 tablet a day for 3 months. All patients in Group II (30 people including 11 men and 19 women) were administered complex treatment, against the background of meloxicam and piaskledine electrophoresis with neocaripasin (using sinusoidal modulated currents (SMS) in a rectified mode 50% 50 Hz with current intensity 0,04-0, 06 mA / cm², lasting 10-15 minutes daily with 14-16 procedures), repeating the course every 3 months for two years. All patients underwent assessment of pain on a Verbal Rating Scale, x-ray of the knee and biochemical blood tests (indicators of inflammation, lipid and carbohydrate metabolism) before and after the comprehensive treatment.

Results and discussion. Following the comprehensive treatment using electrophoresis with neocaripasin against the background of anti-inflammatory drugs and chondroprotectors there was a significant difference in the clinical course of OAP of the knee joints with concomitant metabolic syndrome in two groups

of observation receiving different treatments.

The patients of the first group compared with patients of the second group experienced more intense and prolonged pain according to the visual analogue scale VAS of pain (Figure 1).

Severity of inflammatory syndrome (according to biochemical findings of inflammation values) reduced in the experimental groups, namely in Group II, which was subjected to complex treatment (Table. 1).

Assessment of lipid metabolism according to lipidogram test and glucose, insulin and leptin values according to biochemical blood tests in different groups of patients before and after treatment. Reduction of lipid and carbohydrate metabolism was observed in the group of patients where combined therapy had been used. (Table 2).

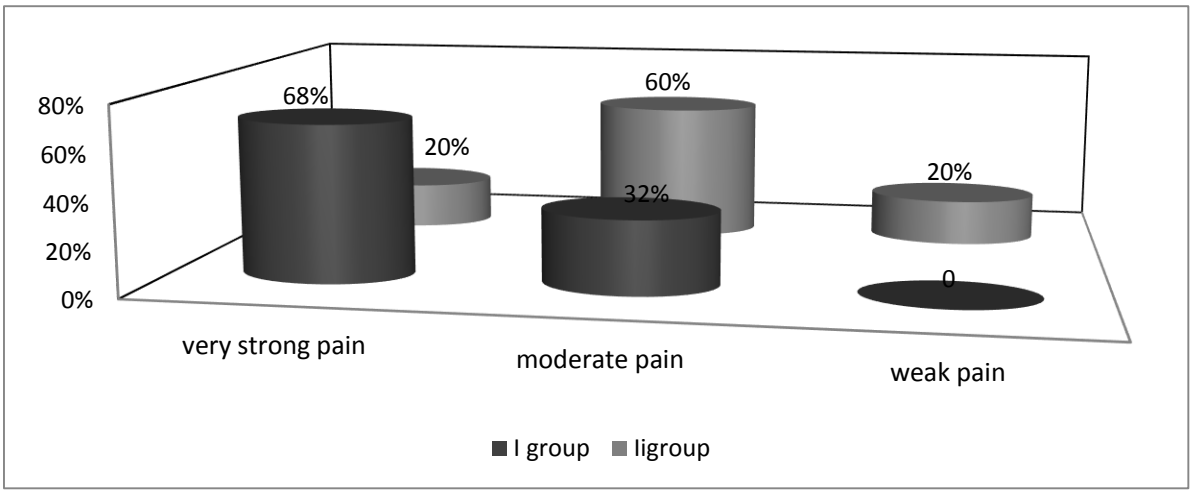

Fig.1. The severity of pain according to VAS pain scale in these groups of patients (r≤0,05).

Table. 1

Acute phase values of inflammation in patients, suffering from OAP with concomitant metabolic syndrome in various groups of treatment.

Value	I group, n= 30 M±m		II group, n= 30 M±m	
	Before treatment	After treatment	Before treatment	After treatment
CRP	+++	++	+++	++ or +
Fibrinogen, g/l	5,2 ± 0,7	4,3±0,2	5,2 ±0,4	3,7 ± 0,3
Seromucoid, unit	0,320 ± 0,002	0,260 ±0,002	0,320 ±0,003	0,230 ± 0,004
ESR, mm/g	34	20	35	15

Table. 2

Values of lipid and carbohydrate metabolism in patients suffering from OAP with concomitant metabolic syndrome in groups with various treatment

Value	I group n= 30 M±m		II group n= 30 M±m	
	Before tratment	After treatment	Before treatment	After treatment
HDL cholesterol, mmol / L	1,19 ± 0,07	1,18 ± 0,07	1,19 ± 0,07	1,17 ± 0,07
TH mmol / l	1,8 ± 0,04	1,7 ± 0,03	1,9 ± 0,04	1,7 ± 0,03
Glucose, mmol / l	7,4 ± 0,3	6,2 ± 0,4	7,3 ± 0,3	5,4 ± 0,4
Insulin mcUn / l	15,2 ± 0,3	14,3 ± 0,2	15,3 ± 0,3	12,2 ± 0,2
Leptin, pg / ml	18,3 ± 0,2	16,5 ± 0,3	18,4 ± 0,2	13,5 ± 0,3

Conclusions: 1. After the tcomprehensive reatment of patients with osteoarthritis peformans of the knee with concomitant metabolic syndrome all values of inflammation decreased by 3 times; lipid and carbohydrate metabolism – by 2 times and pain syndrome after VAS scale decreased by 3 times.

2. After the comprehensive treatment with neocaripasin electrophoresis against the background of anti-inflammatory and chondroprotective therapy, 54% ($r \leq 0,05$) of patients with OAP of the knee with concomitant metabolic syndrome had a slowdown of affecting the knee joints, better efficiency and quality of life.

Prospects of further research. Based on the findings obtained, it is possible to use this comprehensive therapy in future for the treatment of patients suffering from osteoarthritis peformans with concomitant metabolic syndrome.

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THE INFLUENCE OF ECOLOGICAL SITUATIONS IN BUILDINGS OVER THE MYCODIVERSITY

Abstract. *The main aim of present study was to investigate the mycodiversity of micromycetes settled in buildings built in different years in Baku. It was defined that depending on ecological situations different-membered fungi associations appear in different rooms. Bad ecological situations and nonobservance sanitary hygienic instructions environment in buildings result in an active migration of microscopic fungi from the environment into the buildings. This creates a potential infection source in building and causes the increase of risk factor among the people.*
Key words: *buildings, micromycetes, mycodiversity, ecological situations, fungus associations.*

Introduction. The basis of mycological analysis of atmosphere air was put in the middle of last century. It is clear that as an ecosystem, air is an open system consisting of mutual unity and functioning of different microorganisms [2, 8]. If we consider that human organism can not exist without breathing it is unescapable to avoid the mutual influence of atmosphere air, in other words, microorganisms existing in the air, all his life [4]. It is a fact that while living or functioning human organism continuously faces the influence of microorganisms, including microscopic fungi, at home, at work and outdoors.

Also as a result of emergency in buildings, including the corrosion of water tubes, flowing of heating systems, misuse of buildings by people destroy the stable humidity and increases aggression and expansion of microscopic fungi settled here [1, 5, 9].

That's why at the present time (nowadays) when the ecological situation gets worse the biological pollution level of air and its mutual relation to human organisms health is very important and it is the main aim of the present study.

Materials and methods. Samples have been taken using special tools and application method from the ceilings, walls and floors of different rooms, including halls, bathrooms, kitchen, living-room and bedroom of 27 buildings investigated in Baku and they were inoculated to Petri dishes with medium Saburo: neopepton -10 g, glucose-40g, agar-15g, distilled water- 1000 ml (6).

Fungus cultures incubated for 7 days in thermostat under 28^{o}C±2 degree. Fungus colonies formed from this were counted and they were identified according to their morphological and cultural properties. Also the number of fungi were identified by defining the propagules in a gram of applicative material [3, 7].

$$n = \frac{N}{\mathrm{Q\ x\ t}}$$

n-number of fungi in a gram of applicative material; N-number of fungus colonies,

Q-productivity of taking an example, g/min; t-time spent on taking an example, min.

Results and discussion. For investigation examples taken from ceilings, walls, wall-papers, carpet and rag of living room, bedroom, kitchen, bathroom and halls of 23 buildings where emergency were noted, have been analysed. It was shown that in the noted buildings there were 51 micromycetes belonging to 16 genera (Table). The taxonomic structure of aeromicobiota formed in buildings consist of groups (classes) including *Zygomycetes* 6 species of 3 genera, *Ascomycetes* having 3 species of 2 genera, and *Hypomycetes* having 42 species of 11 genera. 82,4% of aerogenmycobiota formed in the investigated buildings belong to *Hyphomycetes* group.

At the same time *Penicillium* represented in 11 species and *Aspergillus* in 9 species make up 47,6% of *Hypomycetes* group and more than half of the whole

aeromycobiota, in other words 52,4%. Together with *Aspergillus* and *Penicillium* genera, *Cladosporium* and *Mucor* both having-represented 4 species, also *Alternaria* represented by 3 species are included to the dominant nucleus of the formed aeromycobiota. Other genera have 1 or 2 species.

As we can see aeromycobiota formed in buildings in (state of emergency) emergent

Table

Taxonomic structure of the micromycetes settled in buildings

№	Micromycetes genera	Micromycetes species
1.	Acremonium	A.charticola W.Gams; A. strictum W.Gams
2.	Alternaria	A.alternata (Fr.) Keissl; A. tennuissima Wiltsehr; A.radicina Meier
3.	Aspergillus	A.clavatus Desm; A.flavus Link:Fr; A.fumigatus Fresen; A.niger Tiegh; A.repens Fischer; A.terreus Thom; A.versicolor Tirab; A.ochraceus K. Will; A.ustus Bainier
4.	Aureobasidium	A.pullulans Arnaud
5.	Chaetonium	Ch.globosum Kunze; Ch. dolichotrichum Ames
6.	Cladosporium	C.cladosporiodes de Vries;C.elatum Nannf; C.herbarum Link; C.sphaerospermum Penz
7.	Eurotium	E.amstelodami Mangin
8.	Fusarium	F.moniliforme Sheld
9.	Mucor	M.circinelloides Tiegh; M.hiemalis Wehmer; M.plumbeus Bonord: M.racemosus Fresen
10.	Paecilomyces	P.aerugineus Samson; P.variotii Banier
11.	Penicillium	P.aurantiogriseum Dierckx; P.brevicompactum Dierckx; P.chrysogenum Thom; P.crustosum Thom; P.cyclopium Westling; P.expansum Link; P.funiculosum Thom; P.ochreceum Thom; P.oxalicum Thom;P.decumbens Thom; P.verrucosum Dierckx.
12.	Stachybotrys	S.atra Corda; S.icolor Gray
13.	Rhizomucor	R.pusillus Schipper
14.	Rhizopus	R.nigricans Ehrenb
15.	Trichoderma	T.polysporum Rifai; T.viride Pers.
16.	Ulocladium	U.chartarum Simmons; U.consortiale Simmons

situation changed noticeblenot only in number, but also in quality.

If we consider that noted micromycetes have pathogen and conditional-pathogen properties, then it is unescapable that infection sources may appear in the ecologically dangerous buildings.

Thus potential pathogen fungi settled in buildings show their opportunistic activity not only (alone) in isolation, but in association as well, which increases the level of micotic diseases among the people. That`s why examples have been taken and analyzed from different rooms. It was defined that depending on the function of the rooms consistent components of fungi associations may increase. Depending on people's preference the walls of the living-room are decorated with colorful wallpapers or colors and they are kept clean as much as possible. It was defined that on the surface of the walls of the living rooms covered with colorful wallpapers usually there are 2 membered fungi associations, including Aspergillusflavus + A.niger or A.fumigatus + A.niger. But in the livingrooms having walls colored with structurally different colors fungi associations are 3 membered: Aspergillus niger+Rhizopus nigricans + Ulocladium Chartarum və ya Aspergillus versicolor + Penicillium fumiculosun + Alternaria alternata.

In the rooms where humidity is destroyed or in the bedrooms, where the level of water activity is more than $a_w \geq 0{,}80$ the structure of fungi associations increase even more and have 6 member:Aspergillus niger + A. Clavatus + Penicillium cyclopium + P.expansum + Cladosporium cladosporioides + Mucor racemosus or Aspergillus niger + A. Terreus + Penicillium decumbens + P. Verrucosum + Alternaria alternata + Mucor circinelloides.

In the bathrooms having non-stablehydrothermic environment there exist special fungi associations and as a rule they have 4 members. It was shown that in bathrooms with tilewalls fungi associations consist of Aspergillus niger + Alternaria alternata+ Penicillium brevi compactum + Cladosporium herbarumand in bathrooms with colored walls fungi associations consist of Aspergillus ustus + Penicillium crustosum + Alternaria tenuissima + Mucor plumbeus.

The kitchens of buildings are always rich with greenery and meet food, and their rests.

That's why the fungi associations formed in kitchens have 6 members characterized with quite enough different speciesAspergillus niger + Penicillium chrysogenum + Cladosporium herbarum + Fusarium moniliforme + Chaetomium globosum + Mucor hiemalis or Aspergillus ochraceus + Penicillium aurantiogriseum + Paecilomyces variotti + Fusarium moniliforme + Rhizomucor pusillus + Trichoderma polysporum.

The halls of the long-termedbuildings are also places where micromycetes are settled intensively and they are characterized with 6 members Aspergillus niger + Penicillium aurantiogriseum + Aureobasidium pullulans+ Cladosporium elatum + Paecilomyces aerugineus + Stachybotrys atra orAspergillus niger + Acremonium charticola + Eurotium amstelodam + Penicillium oxalicum + Ulocladium chartarum + Trichoderma viride.

Microscopic fungi living in the air of buildings reproduce intensively depending on the ecological situation and increase their density in a single screen.

As a result of thisAspergillus niger, A. clavatus, A. ochraceus, Penicilliumexpansum, Chaetonium crustosum, Chaetonium globosum, Trichoderma polysporum, Cladosporium elatum dominate in aeromycobiota. It was even shown that this fungus exists in different associations forms depending on different forms of the aspergillosis diseases that they cause in human organism. For example, Aspergillus niger + Penicillium verocosum; Aspergillus niger + Penicillium expansum; Aspergillus niger + Penicillium cyclopium; Aspergillus niger + Alternaria alternata; Aspergillus niger + Fusarium moniliforme; Aspergillus niger + Mucor hiemalis and etc.

Generally, in the transportation of mycotic diseases species of Aspergillus genera have a special role.

It must be noted that currently there doesn't exist generally accepted norms about the number of microscopic fungi in the air of buildings. Because the difference of the use-length and using rules of buildings cause dramatic change in humidity and temperature factors and it cause a big difference between them. This stimulation or inhibits the spread of microscopic fungi in room environment.

Conclusion. It was defined that depending on ecological situations different-membered fungi associations appear in different rooms. Bad ecological situations and nonobservance sanitary hygienic instructions environment in buildings result in an active migration of microscopic fungi from the environment into the buildings. This creates a potential infection source in building and causes the increase of risk factor among the people.

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MORPHOGENESIS OF FASCIAL AND CELLULAR SPACES OF THE GLUTEAL REGION IN HUMAN FETUSES

Abstract. *Macroscopic examination of topographic and anatomical features of fascial-cellular structures in the gluteal region was carried out on 82 specimens of human fetuses aged 6-10 months. We described the splitting of the gluteal fascia into three layers: superficial, middle and deep ones. Superficial and middle layers form a fascial sheath for the gluteus maximus large muscle, which is separated from the gluteus medius muscle and the musculus tensor fasciae latae of thigh by a deep layer of the gluteal fascia. In the thick of the middle and deep layers of the gluteal fascia there are components of the formation of the upper and lower gluteal neurovascular bundles. In the fetal period of human ontogenesis in the formation of the embryo topography of the pelvic and gluteal fascial layers syntopic correlations of pelvic muscles are of certain importance. In the late gestational period of ontogenesis such parts of the parietal fascia as the obturator fascia and the piriform muscle fascia are the most developed and the gluteal fascia becomes harder.*
Key words: *gluteal region, parietal fascia, gluteal fascia, cellular space, fetus, human.*

Introduction. The problem of topographic and anatomical relationships of the structural elements of the soft skeleton, including fasciae and cellular spaces of the gluteal regions in man remains insufficiently studied in the literature, it is fragmentary and contradictory. Interfascial cellular compartment that lies between the deep fascial layer of the gluteus maximus muscle and the fascia of the middle layer of the gluteal region muscles is divided into a number of cellular cracks by interfascial membranes. The presence of the latter partly explains the complexity of the clinical course of phlegmons in the gluteal region and problems with their drainage. The deep cellular compartment of the gluteal region is located between the sheaths of the gluteus medius and the gluteus minimus muscles [5]. The study of structural and functional characteristics and age structure of the fascia and cellular spaces of the human gluteal region is likely to be practically important for understanding the mechanisms and ways of possible spread of inflammatory processes, abscesses, phlegmons in the gluteal region and synovial bursae, including the bursa trochanterica of the gluteus maximus muscle in order to develop rational approaches and methods for surgical correction of the pelvic girdle muscles and neurovascular structures that pass through suprapiriforme and infrapiriforme foramina [4]. As V. Krutsiak and others state [5] the pus is likely to pass into the cellular tissue of fossa ischioanalis and compartimentum femoris posterius along the sciatic nerve. Along the cellular tissue that surrounds the superior gluteal neurovascular bundle, the deep cellular space of the gluteal region is connected to the lateral cellular space of the lesser pelvis. Parametral and paravesical empyemas can spread into the gluteal region, as well as some abscesses can pass from the area of the acetabulofemoral joint [6]. This study is a continuation of earlier research conducted by us [1, 2].

Objective: to find out the anatomical features of fascial-cellular structures in the gluteal region in human fetuses aged 6-10 months.

Materials and methods. The study was conducted on 82 specimens of human fetuses with 186,0-375,0 mm of crown-rump length (CRL). The material was fixed in a 7% solution of formalin for two weeks, after which we studied topographical and anatomical features of the muscles, fascial-cellular spaces, vessels and nerves in the gluteal region of 6-10 month-old fetuses by means of the method of fine dissection. The sequence of dissection of constituent structures as well as the vascular injection in the gluteal region of human fetuses were carried out by using our own methods [3, 7].

Results and discussion. In the early perinatal period of human ontogenesis (fetuses with 186,0-230,0 mm of CRL) superficial fascia, which is a continuation of the body's superficial fascia, is poorly developed. The fascial spur, which is attached to the iliac crest, separates the subcutaneous adipose tissue of the upper gluteal region into two layers: the superficial and

deep ones. At the same time this fascial spur separates the subcutaneous tissue of the lumbar and gluteal regions. In the sacral area the subcutaneous adipose tissue is absent or poorly developed in 15 out of 18 experimental fetuses aged 6 months (fetuses with 195.0, 220.0 and 225.0 mm of CRL). The gluteal fascia arises from the back surface of the sacral bone and the iliac crest and covers the gluteus maximus from the outside and, partially, the gluteus medius muscle. The gluteus maximus muscle was dissected through its entire depth from the top to the bottom, slightly posteriorly to the middle of the muscle. After drawing apart the cut edges we could see a deep layer of the gluteal fascia through which rare clusters of adipose tissue were observed. At the level of acetabulum from the deep layer of the gluteal fascia deep down the quadrate muscle of thigh, obturator internus muscle as well as the superior and inferior gemellus muscles, fibrous membranes branch away. The deep layer of the gluteal fascia was also dissected. Consequently, the lateral and medial muscle flaps were separated from the underlying small layer of subcutaneous fat, along with the deep fascia. Under the lateral flap, between the tendon of the gluteus maximus muscle and trochanter major there is bursa trochanterica of the gluteus maximus muscle. After drawing apart, the flaps of the gluteus maximus muscle, we found slightly pronounced deep cellular space between the latter and the middle layer of the muscles of the gluteal region, namely: the gluteus medius, piriform, obturator internus, gemellus muscles and the quadrate muscle of thigh. A small layer of loose adipose tissue covers these muscles. We can assume that pyoinflammatory processes from this cellular space can spread in the subfascial space of the back surface of the thigh and slightly anteriorly under the tensor fasciae latae muscle. Then, we carefully removed the connective tissue fat layer while preserving blood vessels and nerves that head to the gluteus maximus muscle. After the removal of cellular tissue, the muscles of the middle layer, vessels and nerves are seen through the remains of thin connective tissue. As a result of close fit of muscles of the middle layer to each other, the boundaries between them are not clear. It should be noted that the fascial sheath of the gluteus minimus muscle in fetuses at this stage is the least developed. Between the gluteus medius and the gluteus minimus muscles there is a thin layer of loose cellular tissue.

From the pelvic surface of the sacral bone the parietal fascia goes to the piriform muscle, covers its part which arises from the sacral bone, and continues along the piriform muscle through the great sciatic foramen to the point of attachment in the area of the trochanter major. The parietal fascia outside the pelvic cavity is loosely connected to the fascial formations that are derived from its own fascia of the perineum. The parietal fascia is more dense above the obturator internus muscle (obturator fascia) and more thinned over the piriform muscle (fascia of the piriform muscle) and the levatoris ani. Fascia of the obturator internus and piriform muscles are fused together along the back edge of the obturator internus muscle. In the latter and in the levatoris ani there are traces of muscle bundles, separated by fascial membranes, which are derived from their own mucular fasciae. In the gluteal region the obturator fascia and fascia of the piriform muscle are quite thin and loose. The pudendal canal is formed by obturator fascia duplication. The parietal pelvic fascia in the point of attachment to the sacral bone (ventrally from the anterior sacral foramen) bounds the great and lesser sciatic foramina. The piriform muscle, passing through the great sciatic foramen, divides it into two parts: the upper one is the suprapiriform foramen and the lower one is the infrapiriform foramen. The suprapiriform foramen is covered by a layer of the gluteal fascia and by the parietal pelvic fascia. The fascial layer of the suprapiriform foramen is fused with the fascial compartment of the upper gluteal neurovascular bundle, including the compartment of the superior gluteal artery. Branches of the superior gluteal artery are surrounded by the venous plexus. The superior gluteal nerve is located outside the homonymous artery and passes between the gluteus medius and gluteus minimus muscles. The infrapiriform foramen is bounded by the parietal pelvic fascia, by piriform muscle fascia, aponeurosis of the pelvic part of the obturator internus muscle and by the gluteal fascia. The parietal fascia and the piriform muscle fascia form a fascial compartment for the sacral plexus branches, including the sciatic nerve (Fig. 1). The inferior gluteal and pudendal neurovascular bundles, the posterior cutaneous nerve of thigh and the sciatic nerve pass in the splitting of the parietal pelvic fascia through the infrapiriform foramen. The latter is covered with a layer of the wide fascia of thigh at the level of the lower edge of the gluteus maximus muscle and is located superficially. The inferior gluteal artery is surrounded by the homonymous vein and branches of the inferior gluteal nerve. Branches of the inferior gluteal artery penetrate into the thickness of the gluteus maximus muscle (Fig. 2).

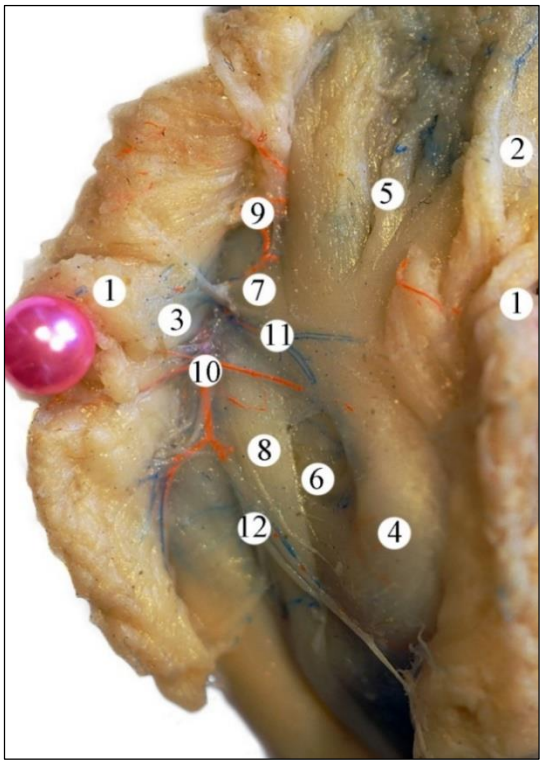

Fig. 1. Right gluteal region of a fetus with 215,0 mm of CRL (rear view) Gross Specimen. magn. 2,2^{x}: 1 – gluteus maximus muscle; 2 – superficial layer of the gluteal fascia; 3 – middle layer of the gluteal fascia; 4 – deep layer of the gluteal fascia; 5 – gluteus medius muscle; 6 – gluteus minimus muscle; 7 – piriform muscle; 8 – fascial compartment of the sciatic nerve; 9 – superior gluteal artery; 10 – inferior gluteal artery; 11 – inferior gluteal vein; 12 – inferior gluteal nerve.

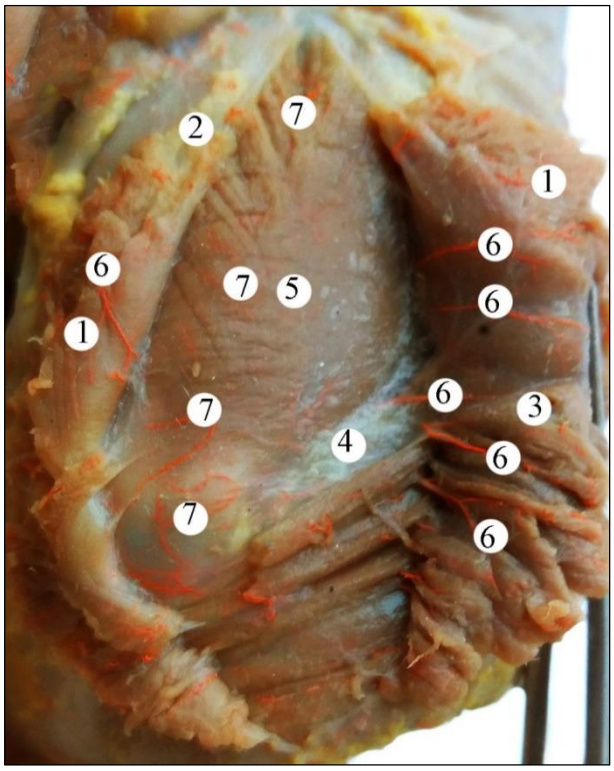

Fig. 2. Left gluteal region of a fetus with 230,0 mm of CRL (rear view). Specimen. magn. 2,6^{x}: 1 – gluteus maximus muscle; 2 – superficial layer of the gluteal fascia;3 – middle layer of the gluteal fascia; 4 – deep layer of the gluteal fascia; 5 – gluteus medius muscle; 6 – branches of the inferior gluteal artery; 7 –branches of the superior gluteal artery.

The superior and inferior gemellus muscles have quite loose and transparent fasciae at the site of adjacency to the upper and lower edges of the obturator internus muscle tendon, so does the quadrate muscle of thigh, and these fasciae are separated from the muscles by a thin layer of loose cellular tissue. In the depth of fascia, which separates the obturator internus muscle from the ischial bone periosteum there is a poorly expressed synovial bursa. The rear layers of the fascial sheaths of these muscles are involved in the formation of the fascial compartment of the sciatic nerve. The cellular tissue of the quadrate muscle of thigh fascial sheath is connected with the deep interfascial space of the gluteal region. Between the coccygeal muscle and the levatoris ani there is little interfascial cellular space.

In 7-month-old fetuses the subcutaneous adipose cellular tissue of the upper gluteal region is divided by a fascial spur, which is attached to the iliac crest, into the superficial and deep layers. The fascial spur also separates the subcutaneous tissues of the lumbar and gluteal regions. In 20 out of 24 7-month-old experimental fetuses there was no subcutaneous adipose cellular tissue in the sacral region. The gluteal fascia, which is a continuation of thoracolumbar fascia, varies in its thickness. Above the gluteus maximus muscle the gluteal fascia is quite thin and it branches in the depth of the muscle, separating it into separate muscle bundles, which, we think, contributes to limiting purulent processes in postnatal ontogenesis.The superficial and middle layers of the gluteal fascia form a fascial sheath for the gluteus maximus muscle. The deep layer of the gluteal fascia separates the gluteus maximus muscle from the gluteus medius muscle and the musculus tensor fasciae latae of thigh.

In 8-month-old fetuses the subcutaneous tissue in the upper side of the gluteal region a spur of the superficial fascia divides it into two layers - superficial and deep ones. The latter one passes in the subcutaneous cellular tissue of the lumbar region above the iliac crest and is called the lumbogluteal adipose cellular tissue. The greatest thickness of the subcutaneous adipose cellular tissue is found in the upper third of the gluteal region and ranges from 1.0 to 2.0 mm. However, in rare cases (fetuses 280.0 and 305.0

mm of CRL) the subcutaneous adipose cellular tissue of the gluteal region reaches 2,8-4,0 mm thick (Fig. 3). In the subcutaneous adipose cellular tissue and the depth of the gluteal fascia layers some arteries are found.

In 8-10-month-old fetuses between the coccygeal muscle and the levator ani muscle interfascial cellular tissue space is found that can be considered as a weak point of the pelvic diaphragm. A thin layer of adipose cellular tissue of the ischio-anal fossa penetrates into the gluteal region through the lesser sciatic foramen. The coccygeal muscle and the levator ani muscle with their fascial sheaths bound the retrorectal cellular space inferiorly. The lateral cellular space is separated from the retrorectal one by the point of attachment of the sacro-retrorectal ligaments to the parietal pelvic fascia along the internal iliac vessels. It should be noted that the superficial and deep layers of subcutaneous adipose cellular tissue of the gluteal region are developed individually and are most pronounced in fetuses with 315,0-375,0 mm of CRL. The thickness and density of the gluteal fascia increase by the end of the gestational period of ontogenesis (Fig. 4).

In the thick of the middle and deep layers of the gluteal fascia the components of the upper and lower gluteal neurovascular bundles pass. In case of inflammatory processes in the superficial intramuscular cellular space (between the layers of the gluteal fascia), they can spread along the vessels and nerves in the lateral cellular space of the pelvis, along the sciatic nerve – in the intramuscular space of the back region of the thigh and along the surface of the gluteal region muscles – to the area of the obturator foramen and the hip.

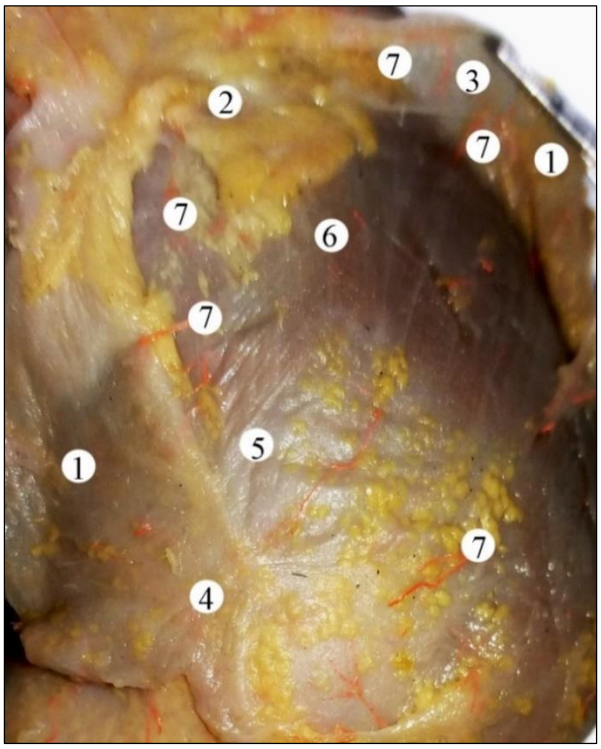

Fig. 3. Left gluteal region of a fetus with 280,0 mm of CRL (rear view). Gross specimen. Magn. 2,5^x: 1 – gluteus maximus muscle; 2 – sacral and gluteal adipose tissue; 3 – superficial layer of the gluteal fascia; 4 – middle layer of the gluteal fascia; 5 – deep layer of the gluteal fascia; 6 – gluteus medius muscle; 7 – arteries of the gluteal fascia.

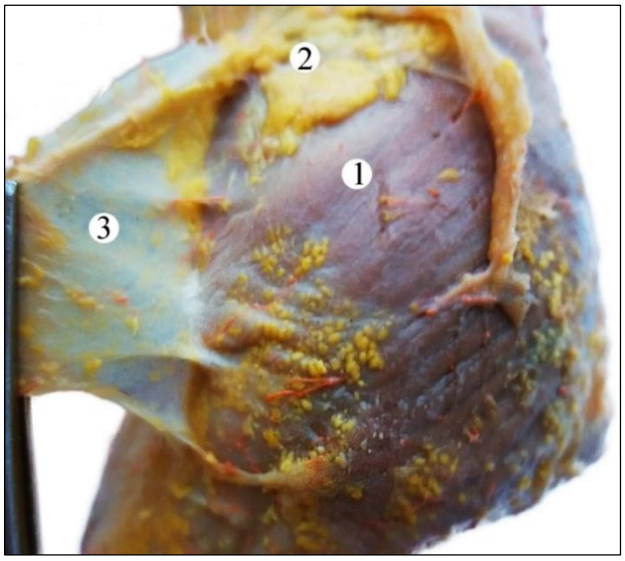

Fig. 4. Left gluteal region of a fetus with 360,0 mm of CRL (rear view). Gross specimen. Magn.. 2,3^x: 1 – gluteus maximus muscle; 2 – lumbar-gluteal adipose tissue; 3 – gluteal fascia.

The majority (18) of the experimental 9-10 – month-old fetuses had a thickened gluteal fascia in the lateral (superior-anterior) part of the gluteal region above the gluteus medius muscle. At the level of the inferior-medial edge of the gluteus maximus muscle the middle layer of the gluteal fascia forms the back wall of the ischio-anal fossa. Fat particles that fill the ischio-anal fossa, are somewhat larger than the fat lobules of subcutaneous adipose tissue.

In the late fetal period of human ontogenesis the parietal pelvic fascia is the most pronounced in the locations of the obturator and piriform muscles, while in the region of the coccygeal muscle it is the least developed. In female fetuses between the base of the broad uterine ligament and the piriform muscle fascia the interfascial cellular space is found. The parietal pelvic fascia separates the major nerves and blood vessels of the pelvic cavity, e.g. the branches of the sacral and coccygeal plexus are mainly located between the bone and muscle walls of the pelvis and the fascia. The neurovascular bundles, emerging from the pelvic cavity through the supra and infrapiriform foramina, penetrate the parietal fascia of the pelvis.

Conclusions. 1. In human fetuses the superficial and middle layers of the gluteal fascia form a fascial sheath for the gluteus maximus muscle. A deep layer of the gluteal fascia separates the gluteus maximus muscle from the gluteus medius muscle and from the musculus tensor fasciae latae. There is a poorly pronounced cellular space between the gluteus maximus muscle and the middle muscular layer of the gluteal region. In the depth of the middle and deep layers of the gluteal fascia the components of the superior and inferior gluteal neurovascular bundles pass. The middle layer of the gluteal fascia is involved in the formation of the back wall of the fossa ischioanalis. Hardening of the gluteal fascia is observed in the lateral part of the gluteal region above the gluteus medius muscle and within the foramen ischiadicum majus. By the end of the gestational period of ontogenesis the gluteal fascia become thicker and harder.

2. The parietal pelvic fascia is the most pronounced in the locations of the obturator and piriform muscles; it is the least developed in the area of the coccygeal muscle. The parietal pelvic fascia bounds nerves and vessels of the pelvic cavity, the branches of the sacral and coccygeal plexuses, for example, are mainly located between the pelvic musculoskeletal wall and the fascia. The neurovascular bundles, emerging from the pelvic cavity through the suprapiriform and infrapiriform foramina, pass through the parietal pelvic fascia.

Prospects of further research are to study anatomical and topographic features of fasciae and cellular spaces of the pelvis and gluteal region in human newborns that will be important for the development of rational methods of drainage of purulent inflammation of the lesser pelvis and the gluteal region.

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POLARIZATION PROPERTIES OF THE TISSUES OF SOME ENDOCRINE GLANDS OF INTACT RATS

Abstract. *The polarization properties of the tissues of some endocrine glands of the thyroid and suprarenal glands tissue based on histological section were studied in the paper. The investigation by means of laser polarimetry method of the thyroid and suprarenal tissue demonstrated the polarization properties of the glands of intact rats in health.*
Key words: *thyroid gland, suprarenal gland, laser polarimetry.*

Introduction. For the last decade topicality of the use of laser polarimetry methods has grown to determine properties of biological tissues as exactly they allow to find out the spatially updiffused properties of an object, define the presence of dissipation areas distribution and get local high-frequency information. Interesting are possibilities of the use of laser polarimetry methods to determine the properties of glandular tissue, namely tissues of the thyroid and suprarenal glands. In the process of development of diagnostic methods, it was found that the peculiarity of biological tissue structure is a double-base amorphously crystalline structure [1]. The use of lasers in biomedical optics stipulated the development of a number of researches – laser polarimetry of the biological tissues, which is based on the statistical analysis of polarizing-inhomogeneous objective fields [3, 7]. Radiation field dispersed by biological tissue, becomes the carrier of information about their properties. This information is found to be contained in photometric, spectral, polarization and correlation characteristics of light vibrations [5]. However, the questions of the use of laser polarimetry methods remain little studied to examine the properties of glandular tissue, such as the thyroid and suprarenal glands which is topical for differential diagnostics of their pathological processes [6].

Objective: to study polarizing properties of optically thin cuts of the thyroid and suprarenal glands tissues of intact rats.

Materials and methods. Researches are conducted on 20 white mature rats-males with initial body weight 100-150 grammes. To study polarization properties of the thyroid and suprarenal glands they were removed and fixed in 10% neutral formalin solution with the triple change of a fixator, dehydrated in the alcohols of growing concentration, whereupon sealed in paraffin blocks. Microsections 5-6 mkm thick were made and studied under BIOLAMAS P-12, a light microscope. To estimate diagnostic possibilities of statistical analysis of the tissue images of the glands non-stained microsections (20 preparations) were examined from physiological normal glands of the intact rats. Polarization images of the thyroid and adrenal tissues were received by microobjective lens, projected in the plane of photosensitive ground (800x600 pixel) of CCD- camera, which provided the range of measuring structural elements of the biological tissues for such sizes: 2 mkm – 2000 mkm. Examination of polarization images of gland tissues are presented by an optical chart (fig. 1). Illumination was conducted by the parallel ($\varnothing = 10^4$мкм) bunch of He-Ne laser (λ = 0.6328 мкм, W = 5.0 мВт). Polarization illuminator consists of quater wave plates 3; 5 and polarizer 4, that provides forming of laser bunch with an arbitrary azimuth $0^0 \le \alpha_0 \le 180^0$ or ellipticity $0^0 \le \beta_0 \le 90^0$ of polarization.

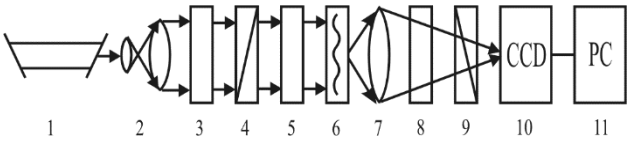

Fig. 1. Optical chart of polarization images examination of microsections of the thyroid and suprarenal gland tissues

Results and discussion. Polarization images are presented on (fig. 2) optically thin microsections of the thyroid glands in the norm (coefficient of weakening, $\tau \le 0{,}1$ geometrical

thickness 40 μm) for axial (0 – 0) and crossed (0 – 90) polyarizer 4 and analyzer 9. As a basic analytical instrument to evaluate aggregation of casual values characterizing the image of a biological object (intensities) and its optical geometrical structure (directions of orientations of protein fibrils ρ and index of double refraction of their matter Δn), the statistical moments of the first *M*, second σ, third *A* and fourth *E* orders of their values were used, which calculated by finding an average on every pixel of recording CCD – camera.

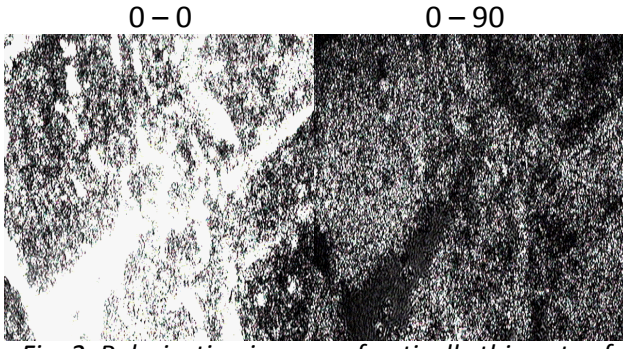

Fig. 2. Polarization images of optically thin cuts of the thyroid gland, got for axial (0 – 0) and crossed (0 – 90) polyarizer and analyzer

The findings obtained demonstrate the tendency of growth of statistical moments values of distributing orientations of the thyroid gland tissue. The statistical moments of the third (A_ρ) and fourth (E_ρ) order grow most quickly (table.1). Polarization images are presented on (fig. 3, 4, 5, 6) optically thin microsections of the cortical and medullar tissues of the adrenal

Table 1

Statistical moments of 1 – 4 th orders of the coordinate distribution of intensity of the thyroid gland images

I	$I(0-0)$	$I(0-90)$
M	0,9 ± 5%	0,6 ± 4%
σ	0,23 ± 4%	0,29 ± 6%
A	38,6 ± 7%	26,8 ± 11%
E	74,2 ± 9%	132,8 ± 14%

gland in the norm (coefficient of weakening, geometrical thickness 40 μm) got for axial (0 – 0) and crossed (0 – 90) polyarizer 4 and analyzer 9.

An image of optically-thin (a coefficient of weakening, is a geometrical thickness 40) microsections of fabric is the prostates got for співвісних (0 – 0) and crossed (0 – 90) поляризатора 4 and analyzer 9 presented on rice. 7.

The findings obtained demonstrate the

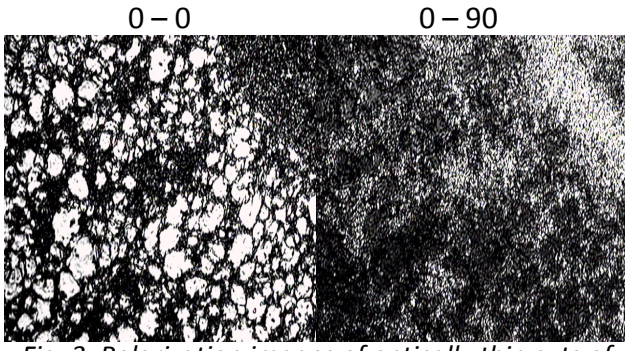

Fig. 3. Polarization images of optically thin cuts of the glomerular zone tissue of the adrenal gland, got for axial (0 – 0) and crossed (0 – 90) polyarizer and analyzer

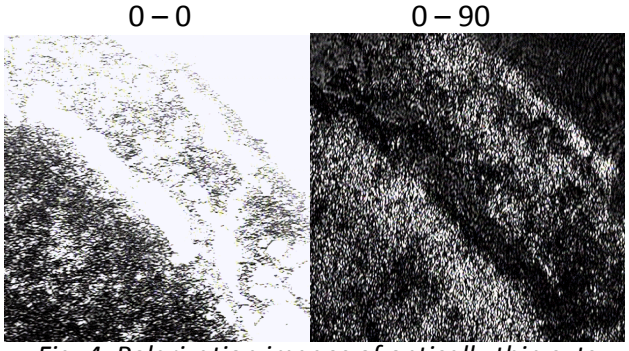

Fig. 4. Polarization images of optically thin cuts tissues of the fasciculate zone of the adrenal cortex, got for axial (0 – 0) and crossed (0 – 90) polyarizer and analyzer

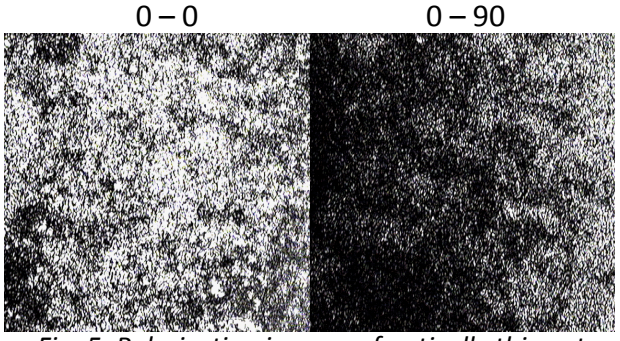

Fig. 5. Polarization images of optically thin cuts tissues of the reticular zone of the adrenal cortex, got for axial (0 – 0) and crossed (0 – 90) polyarizer and analyzer

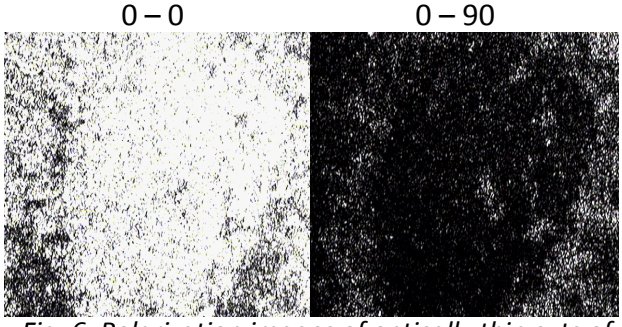

Fig. 6. Polarization images of optically thin cuts of the adrenal medulla, got for axial (0 – 0) and crossed (0 – 90) polyarizer and analyzer

tendency of growth of statistical moments values of distributing orientations of the prostate gland tissue. The statistical moments of

0 – 0 0 – 90

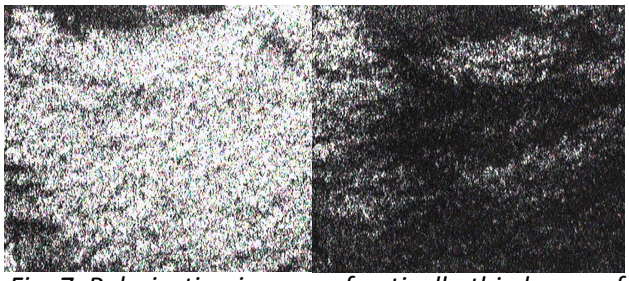

Fig. 7. Polarization images of optically-thin layers of fabric are the prostates got for axial (0 – 0) and crossed (0 – 90) polyarizer and analyzer

the third (A_ρ) and fourth (E_ρ) order grow most quickly (table.2).

Table 2

Statistical moments of 1-4 orders of co-ordinate distributions of intensity of images of fabric of prostate gland

I	I (0 - 0)	I (0 - 90)
M	0,9 ± 5%	0,6 ± 4%
σ	0,23 ± 4%	0,29 ± 6%
A	38,6 ± 7%	26,8 ± 11%
E	74,2 ± 9%	132,8 ± 14%

Statistical approach in the analysis of polarization images was found to detect considerable diagnostic sensitiveness of the moments of higher distribution orders of image intensity of optically thin microsections of the thyroid and suprarenal glands [4]. Consequently, the results obtained correlate with previous information of statistical researches of polarization properties of other biological tissues (derma of skin, muscular tissue) [2,5].

Conclusion. Performed polarization researches for intact animals allowed to set the parameters of the norm of polarization properties of the thyroid and suprarenal glands tissues in rats.

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EXPERIMENTAL DETERMINATION OF ADAPTOGENIC PROPERTIES OF PULSATILLA PATENS AQUEOUS EXTRACT UNDER IMMOBILIZATION STRESS

Abstract. *In an experiment on laboratory animals we determined adaptogenic properties of pulsatilla patens aqueous extract (1:10) in different volumes under an immobilization stress. Analysis of the experimental results shows that the pulsatilla patens aqueous extract has a pronounced sedative and soporific effect.*
Keywords: *pulsatilla patens, water plant extract, immobilization stress, conjugated dienes, malondialdehyde, spectrophotometric method.*

Introduction. Different types of stress are known to be a leading cause of desynchronization of biological rhythms of functional systems of the body (neuroses, chronic fatigue, heart disease, cerebrovascular dissorders), which in turn leads to a reduced quality of life [1, 2]. An urgent task of modern medical science is the search for biologically active substances with antioxidant action [3]. Herbal adaptogens are of particular interest, since they are easily incorporated into the biochemical processes of the body, providing multilateral, soft and safe effects in case of their prolonged use. Using herbal medicines is economically efective in preventive measures with the use of phyto-adaptogenes in the activation of lipid peroxidation (LPO) of cell membranes, induced by an adverse influence of environmental factors [4]. We know that the list of adaptogenic herbal medicines is limited. In this regard, continuing a search, a study and implementation of new adaptogenic herbal drugs which, besides being specifically active, would be comfortable and safe to use, is especially important [5].

Objective: is the determination of adaptogenic properties of pulsatilla patens aqueous extract (1:10) under immobilization stress.

Materials and methods. The experimental study was performed on 36 rats of WAG line with average weight of 210-230 g. Stress simulating effect was studied in a model of chronic neuromuscular tension that was reproduced within 5, 15 and 30 days [1]. Immobilization stress was simulated by keeping the rats for 5 h. daily in plastic cage-cases. The animals were divided into 6 groups with 6 animals in each of them. [1].

Animals of the first (intact) and the second groups were administered distilled water in a volume of 1.5 mL (conditional norm) intragastric per os. The animals of the 2nd -6th groups were subjected to immobilization stress and they also were administered pulsatilla patens aqueous extract (1:10) intragastric per os (in different amounts) every day an hour before stress exposure, 3rd group - 0.5 ml 4th group – 1 ml, 5th group – 1.5 ml, 6th group – 2 ml, respectively. Animals of all groups were decapitated under ether anesthesia 5 hours after simulating immobilization stress (on the background of maximum exposure to stress). We used the blood serum, where we determined the LPO, namely: the level of primary oxidation products - conjugated dienes (CD) and secondary products - malondialdehyde (MDA) using the spectrophotometric method [6]. The same spectrophotometric method was used to determine the condition of the antioxidant system, namely: the activity of catalase and superoxide dismutase (SOD) [7].

Results and discussion. LPO condition was determined by the number of peroxidation products: CD and CTB – AP (Table). Table 1 shows that under the conditions of immobilization stress during 5 days, these figures become significantly higher: CD level by 2 times, CTB-AP by 1.5 times higher than the control; within 15 days by 2.5 and 2 times, respectively; 30 days by 3 and 2 times respectively. Within 5, 15-days pulsatilla patens aqueous extracs in a volume of 0.5 ml, 1 ml, 1.5 ml and 2ml do not statistically reliably reduce the level of CD and CTB-AP relatively to an immobilization stress. Only within 30 days all pulsatilla patens aqueous extracts statistically reliably reduce the level of CD and CTB-AP relatively to an immobilization stress and are

Table

Results of pharmacological intervention with pulsatilla patens aqueous extract (1: 10) and its effect on PLO and antioxidant system in the blood serum against the background of an immobilization stress (n=6)

Parameter	Experiment duration	Intact animals	Immobilization stress + pulsatilla patens aqueous extract				
			-	0,5 мл	1 мл	1,5 мл	2 мл
CD, mmol / l	5 days	14,16±0,64	30,72±1,06*	29,25±0,16*	27,56±0,19*	25,22 ± 0,34*	24,21±0,34*
	15 days		34,85±0,85*	28,08±0,12*	26,12±0,45*	25,04 ± 0,89*	26,32±0,39*
	30 days		37,85±0,12*	21,76±0,54*,**	22,14±0,44*,**	21,01 ± 0,1*,**	20,2±0,12*,**
MDA, mmol / l	5 days	4,65±0,10	6,94±0,16*	5,89±0,17*	5,67±0,34*	5,47±0,32*	5,43±0,45*
	15 days		7,15±0,45*	6,91±0,25*	6,44±0,21*	6,12±0,21*	6,07±0,56*
	30 days		7,56±0,78*	5,21±0,21**	5,14±0,06**	4,98±0,03**	4,17±0,67**
SOD, st.un.	5 days	3,59±0,11	6,93±0,49*	3,56±0,08**	2,98±0,35**	2,54±0,12*,**	2,3±0,19*,**
	15 days		6,98±0,23*	2,94±0,3*,**	2,15±0,23**	2,13±0,42*,**	2,21±0,31*,**
	30 days		7,13±0,89*	2,12±0,15*,**	2,09±0,2*,**	2,11±0,19*,**	2,03±0,09*,**
Catalase, st.un.	5 days	5,10±0,13	5,88±0,26*	3,99±0,12*,**	3,59±0,07*,**	3,87±0,12*,**	3,43±0,31*,**
	15 days		6,03±0,21*	4,02±0,22*,**	3,23±0,05*,**	3,12±0,11*,**	3,34±0,07*,**
	30 days		6,23±0,03*	3,56±0,01*,**	3,45±0,05*,**	3,13±0,12*,**	3,02±0,23*,**

Note: * – P < 0,05 compared to the parameters in the intact animals;

* – P < 0,05 compared to the parameters in the intact animals;

** – P < 0,05 compared to the parameters in the animals while simulating the immobilization stress.

close to the control (P <0.05). For instance, the

CD level under the conditions of immobilization stress +0.5 ml, 1 ml, 1.5 ml and 2 ml of pulsatilla patens aqueous extract decreases by 1,8-1,7-1,8-1,9 times respectively.

The level of CTB-AP under an immobilization stress conditions is +0.5 ml, 1 ml, 1.5 ml and 2 ml of pulsatilla patens aqueous extract decreases by 1,45-1,47-1,5-1,8 times respectively (P <0 , 05).

The state of the antioxidant system was determined by the number of catalase and SOD products. Table. 1 shows that under the conditions of immobilization stress these figures are much higher. The level of catalase under an immobilization stress during 5 days is statistically reliably higher by 1.15 times, SOD by 2 times higher than the control; 15 days - by1.5 and 2 times, respectively; 30 days by 2 and 2.5 times respectively (P <0.05). Table. 1 shows that within 5, 15 and 30 days all pulsatilla patens aqueous extracts affect the level of catalase and SOD in the serum of rats: they statistically reliably lower these rates relatively to immobilization stress. For instance, within 5 days SOD level under immobilization stress + 0, 5 ml, 1 ml, 1.5 ml and 2 ml of pulsatilla patens aqueous extract decreases by 2-2,3-2,7-3 times respectively (P <0.05). The level of catalase in conditions of immobilization stress + 0, 5 ml, 1 ml, 1.5 ml and 2 ml of pulsatilla patens aqueous extract decreases by1,47-1,6-1,5-1,7 times respectively (P <0 , 05). Within 15 days SOD level decreases by 2,37-3,25-3,28-3,16 times respectively (P <0.05). The level of catalase decreases by1,5-1,9-1,9-1,8 times respectively (P <0.05). Within 30 days SOD decreases by 3,36-3,4-3,38-3,5 times respectively (P <0.05). The level of catalase decreases by 1,75-1,8-2-2,1 times respectively (P <0.05).

Conclusions. Considering the results of the study of LPO (CD and CTB-AP) parameters in conditions of chronic immobilization stress, we can conclude that these parameters do not statistically reliably get adjusted relatively to the control. Only within 30 days all pulsatilla patens aqueous extracts statistically reliably lower the leves of CD and CTB-AP relatively to immobilization stress and bring them closer to the control. A study of catalase and SOD in conditions of chronic immobilization stress shows that these rates are better adjusted than the figures of LPO (CD and CTB-AP), it indicates that the pulsatilla patens aqueous extract possesses a strong antioxidant action. Thus, among the experimental pulsatilla patens aqueous extracts those in a volume of 1.5 and 2ml have wider impact on the processes of lipid peroxidation in the blood and antioxidant system.

Prospects for further research. The results of the study could be a foundation for the development of new domestic plant drugs with sedative and soporific effects, containing pulsatilla patens aqueous extract.

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PECULARITIES OF CIRCADIAN RHYTHM OF THE BLOOD PRESSURE INDEXES IN SCHOOL AGE CHILDREN USING DAILY BLOOD PRESSURE MONITORING

Abstract. *Were examined 30 children who were hospitalized in the pediatric department of Children's Clinical Hospital, Chernivtsi. Daily blood pressure monitoring performed in the hospital using the device Ambulatory Blood Pressure Monitor Holter ABPM50.*
Among the children surveyed normal circadian index had only two patients (1.28 and 1.32 i.u.). The remaining patients had rigid circadian rate (less than 1.2 i.u.), which may indicate the presence of vegetopathology in violation of both afferent and efferent chains so vagosympatic regulation of heart rate, the phenomenon of «denervated» heart
Key words: *children, school age, blood pressure, daily monitoring of blood pressure.*

Introduction. Hypertension – one of the most common problems of today, including modern pediatrics. At present, the share of essential hypertension in children and adolescents account for 10-35%, while the share of second – 65-90%. High blood pressure in children is ≥90-percentile distribution curve of blood pressure in the population for that age, gender and height. Blood pressure ≥90-th percentile but <95th percentile (or ≥120/80 mm Hg. In.) is high and is interpreted as normal. For better diagnosis of hypertension in children is using daily monitoring of blood pressure.

Objective: to assess blood pressure in children by daily monitoring of blood pressure.

Materials and methods. Were examined 30 children who were hospitalized in the pediatric department of Children's Clinical Hospital, Chernivtsi. Their average age amounted 14.2±0.21 years. We used the following methods: clinical, anthropometric, laboratory, and statistical tools. Children conducted daily monitoring of blood pressure.

Daily blood pressure monitoring performed in the hospital using the device Ambulatory Blood Pressure Monitor Holter ABPM50 using the cuff, the amount of which was selected according to age and arm circumference of children. Registration of blood pressure and heart rate was carried out in the phase of compression by oscillometric method. The interval between measurements during the day was 30 minutes, during the night rest – 2 hours. The study involved 30 school age children aged 13-17 years (mean age 15.1±0.5 years).

Results and discussion. Most of the children did not show any complaints. A group of children for the survey was selected on the basis of the establishment of high blood pressure during routine inspection and/or detect elevated body mass index. Only one third of surveyed complained of headaches, pain in the heart, poor health with significant psycho-emotional and physical stress.

Table 1

Anthropometric indexes of children

Index	Group of exanimate children (n=30)	
	BMI < 24.9 kg/m^2 (n=22)	BMI > 24.9 kg/m^2 (n=8)
Height, cm	172.7±0.03	178.0±0.01*
Weight, kg	65.5±3.4	93.0±4.4*
BMI, kg/m^2	21.9±0.8	29.4±1.3*

*– $p < 0.05$

In surveyed children the average systolic blood pressure (SBP) level was 115.5±3.7 mm Hg, average night level of SBP – 105.9±4.3mm Hg. The average daily level of diastolic blood pressure diastolic blood pressure (DBP) was 63.4±2.7 mm Hg, average night DBP level – 54.8±2.7 mm Hg (fig. 1).

Normally circadian value index is 1.24-1.44 s.u., indicating a stable organization of vegetative circadian rhythm of the heart. Among the children surveyed normal circadian index had only two patients (1.28 and 1.32). The remaining patients had rigid circadian rate (less than 1.2), which may indicate the presence of vegetopathology in violation of both afferent and efferent chains so vagosympatic regulation of heart rate, the phenomenon of «denervated» heart.

Based on the results of the analysis and comparison of average levels of daily and nightly average level of AP to the group of dippers (patients with normal night decrease of blood pressure, both systolic and diastolic, daily index is in the range 10-20%) became 8 children (fig. 2).

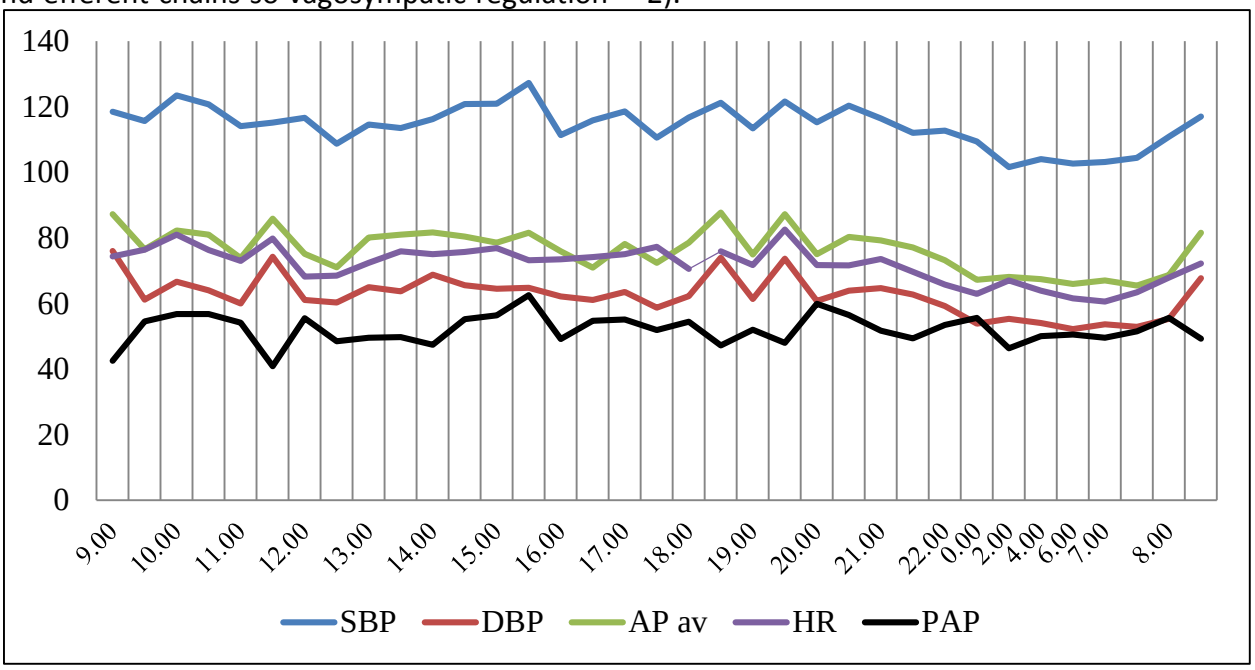

Fig. 1. The main blood pressure indexes in surveyed children

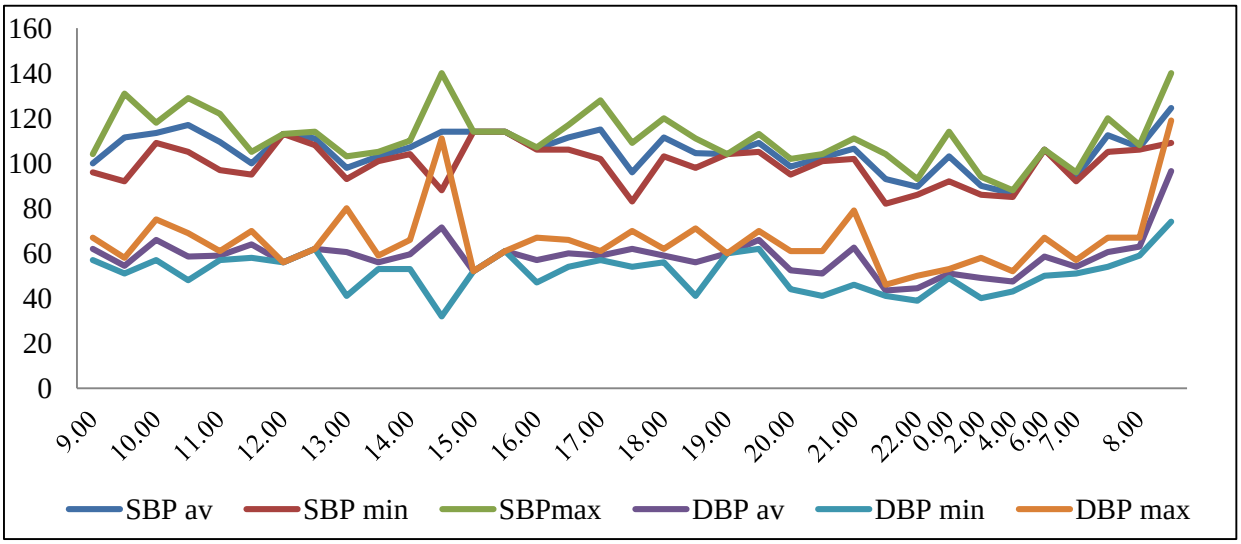

Fig. 2. Dippers

Children with insufficient nocturnal decline of blood pressure (circadian index less than 10%), non-dippers, was 14, 4 of them had a daily index of less than 10% of both SBP and DBP, in three children there was insufficient reduction at night only of SBP, while DBP reduction was between 10-20% (fig. 3).

Three patients were assigned to a group of over-dippers (excessive blood pressure lowering night, more than 20.0%) which was registered only at night DBP reduction of over 20% compared to daytime performance and reduce nightly average SBP compared to the average SBP was within normal limits (fig. 4).

One boy was assigned to a group of night-peakers because he was registered nightly average DBP increase of 11.5% compared to the average dates.

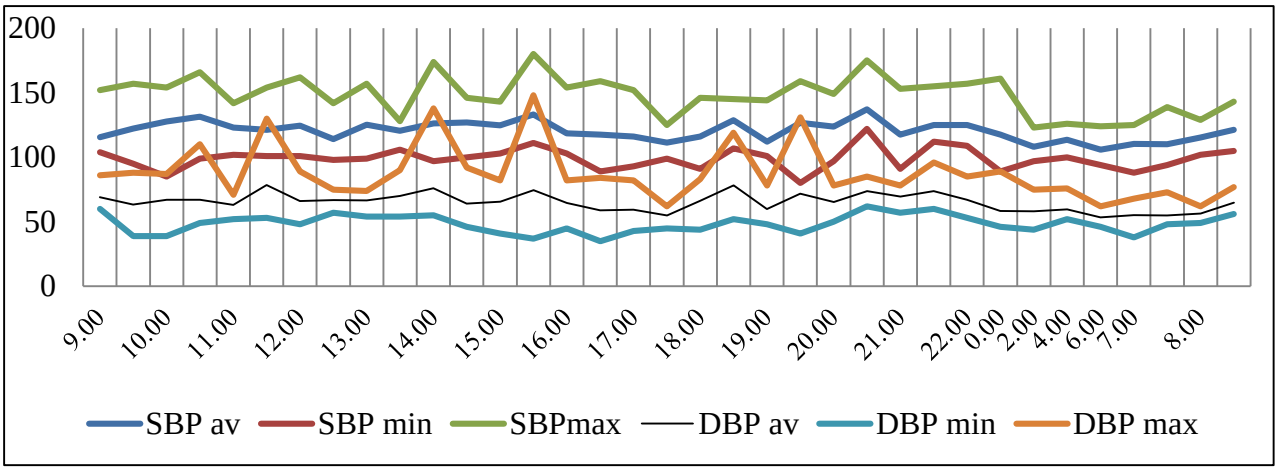

Fig. 3. Non-dippers.

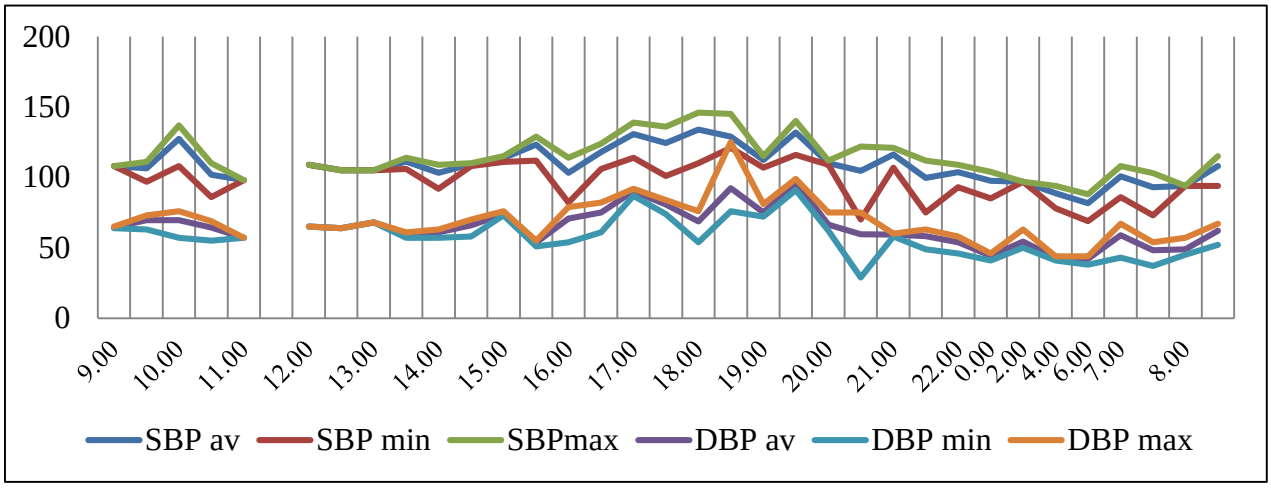

Fig. 4. Over-dippers.

Conclusions. Thus, in children, in which during routine inspection it was found increased blood pressure and/or detect elevated body mass index, there is variability of daily blood pressure monitoring indicators. According to the nowadays studies, that shows that the most important modulator of systemic blood pressure, the violation of which leads to changes in circadian blood pressure profile is the tone of the autonomic nervous system, we can assume that received daily blood pressure monitoring features related with background imbalance of the autonomic nervous system, which leads to inadequate nocturnal blood pressure reduction. In groups with insufficient and/or excessive nocturnal decrease of blood pressure and increased blood pressure in night there is no adequate night normalization of blood pressure due to the influence of neurohormonal systems which require further study.

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REGULARITIES OF ANNUAL CHANGES IN PHYSICAL HARMONY INDICES IN FIRST YEAR STUDENTS

Abstract. *We have determined indexes of physical development harmony in youths: cadets, students, pupils and analysed the regularities of annual changes in conditions of the pedagogical process during the first year of study. Based on the obtained data, we conducted a comparative analysis of these indicators in boys from different educational institutions. We detected a dynamic growth of most average parameters, which means that their annual changes were reliably higher than those in the students and pupils. The most frequently a reliable difference in favour of cadets was found for the body mass index, mass-growth index and the corpulence index (Rohrer).*
Key words: *adolescence, indexes of physical development harmony, pedagogical process.*

Introduction. The combination of various environmental factors, that affect the body, are exogenous factors: natural, environmental and socio-economic ones. Day regimen and the diet, mode of motion, the emotional stress are among the exogenous factors occupying a special place [6]. These exogenous factors, along with others, are a part of the pedagogical process. By the time of admission to universities, youngest people reach a certain degree of physical maturity, but their physical and mental development continues [2, 7]. The impact of innovative educational loads with high levels of emotional and mental stress, the intensification of educational process, irregularities in the mode of motion have a negative impact on the functionality of the student's body [1]. The importance of optimal and harmonious development of young people leads to an intensive study of morpho-functional parameters influenced by exogenous and endogenous factors. Physical development is traditionally assessed by using different indices. They allow determining the level of the boys' development using the ratio of some anthropometric parameters and indicate the features of the body shape, complement the characteristics of physical development [4]

Thus, today there are some scientific papers which study the effect of endogenous and exogenous factors on anthropometric parameters of youths. However, there are not any papers, which determine and compare annual changes in indices of harmonious physical development during the educational process in various educational institutions.

Objective: determination of features of annual changes in indices of harmonious physical development of boys in the first year during the educational process in various educational institutions.

Materials and methods. The research was carried out at M.I. Pyrohov Vinnytsia National Medical University and Vinnytsia Higher Vocational School of Civil Protection. The school is a departmental higher institution of the second accreditation level, belonging to the State Emergency Service of Ukraine (SES) where students and cadets are taught. Training cadets has its own features related to the service in the bodies and units of SES. All the cadets are employed in the SES, have special ranks, and their daily routine is compiled in accordance with the Charter of the Armed Forces of Ukraine. The conditions of the pupils differ from those of the cadets in less regulated daily routine and less physical activity. Medical University is a higher school of the fourth accreditation level of the Ministry of Health. Conditions of medical students are different from the living conditions of cadets and pupils. Their regime of the day is not regulated at all, their physical activity is lower and the teaching load is higher. We measured anthropometric parameters [5] and determined indices of harmonious physical development of 87 boys-cadets, 93 pupils, 92 students and analyzed the characteristics of their changes during the first year. We determined the body mass index, proportionality of the chest, shoulder width, pelvic width, proportionality of body length, proportionality of upper and lower limbs, sexual dimorphism as well as corpulence (Pigna) and Rees-Eisenck indices[3]. An analysis of these parameters was carried out using STATISTICA-6,1

(StatSoft) using parametric and nonparametric methods for assessing the performance.

Results and discussion. The average annual change in body mass index for boys-cadets during the first year of studiesis is (0,23 ± 0,06) kg / m², for pupils - (0,06 ± 0,03) kg / m², for students (-0,04 ± 0,03) kg / m². Thus the annual change in body mass index in the first year students is reliably higher by 0.17 kg / m² compared with the pupils (t = 2,54 at r≤0,05) and 0.27 kg / m² compared with the students (t = 3.11 at r≤0,05) (Fig. 1). The average annual change in the index of proportionality of the chest for adolescent first year cadets is (0,61 ± 0,05), for the pupils - (0,27 ± 0,07), students (0,18 ± 0,03). Thus the annual change in the index of proportionality of the chest in the first year cadets is reliably higher by 0.34 compared with the pupils (t = 3,94 at r≤0,05) and by 0.43 compared with the students (t = 3,00 at r≤0,05). The average annual change in the index of shoulder width in adolescent first year cadets is (0,41 ± 0,03), whereas in the pupils and students it was (0,01 ± 0,01). Thus the annual change in the index of shoulders width in the first year cadets is reliably higher by 0.40 compared to both the pupils and the students (t = 10,61, and t = 9,21 at r≤0,05) (Fig. 2).

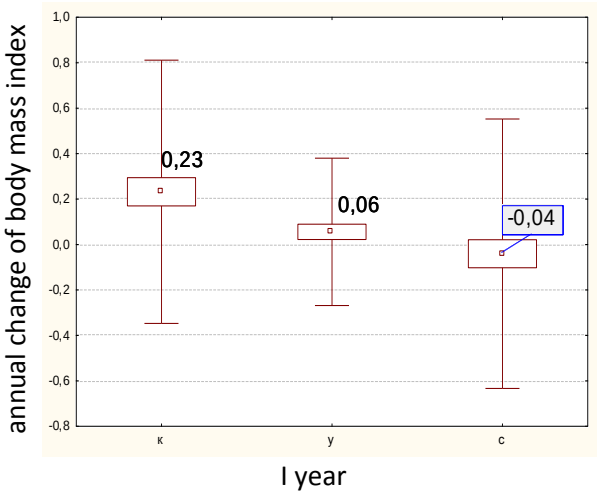

Fig. 1. The difference between the annual change in BMI at the first year of study.

The average annual change in the index of pelvic width of adolescent first year pupils is (0,02 ± 0,01), the minimum rate is (-0.27), the maximum one reaches 1.14. The average annual index changes in the width of the pelvis of cadets and students is (0,12 ± 0,02). Thus the annual change in the index of pelvic width in the first year cadets is reliably higher by 0.10 compared with the pupils (t = 3,03 at r≤0,05). The average annual change in the index of proportional length of the upper extremity in adolescent first year cadets is (0,17 ± 0,04),

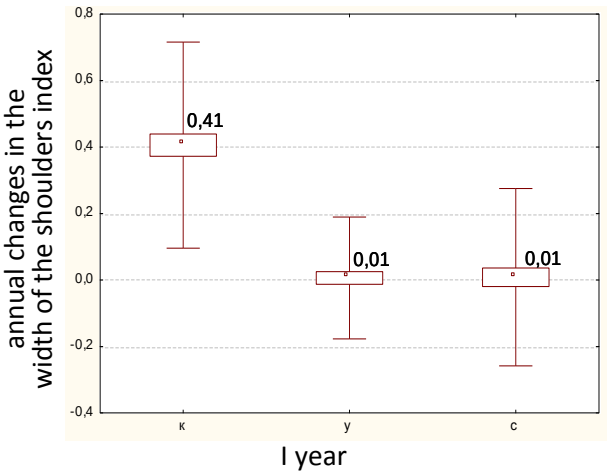

Fig. 2. The difference between annual changes in the width of the shoulders index at the first year of study.

for the pupils - (0,03 ± 0,02), for the students (-0,13 ± 0,03). Thus the annual change in the index of proportionality of the upper limb length in the cadets is reliably higher by 0.14 compared with the pupils (t = 3.41 at r≤0,05) and by 0.30 compared with students (t = 7 06 at r≤0,05). Besides, the same annual change in the pupils was reliably higher by 0.16 than in students (t = 4,51 at r≤0,05). The average annual change in the index of lower limb length proportionality in adolescent first year cadets is (0,12 ± 0,02), students (-0,07 ± 0,02), while the average value in the pupils has not changed. The annual change in the index of proportionality of the lower limb length in the first year cadets is reliably higher by 0.12 compared with the pupils (t = 4,88 at r≤0,05) and by 0.19 compared with the students (t = 6,94 at r≤0,05). Also, the same annual change in the index in the pupils was reliably higher by 0.07 than in the students (t = 3,19 at r≤0,05). The average annual change in the index of sexual dimorphism of adolescent first year cadets is (2,13 ± 0,17). The average annual change in the index values of sexual dimorphism of pupils and students is (0,11 ± 0,09) and (0,20 ± 0,16) respectively. The annual change in the index of sexual dimorphism in the first year cadets is reliably higher by 2.02 compared with the pupils (t = 10,26 at r≤0,05) and by 1.93 compared with the students (t = 8,10 at r≤ 0.05). The average annual change in the index of corpulence (Pigna) in adolescent first year cadets is (0,01 ± 0,00), in the students (-0,01 ± 0,00), while the average index in the pupils has not changed. Thus the annual change in the index of corpulence (Pigna) in the first year cadets is reliably higher by 0.01 compared

with the pupils (t = 2,40 at r≤0,05) and by 0.02 compared with the students (t = 3, 81 at r≤0,05). Also the same annual change in the index of the pupils was reliably higher by 0.01 than in the students (t = 2,39 at r≤0,05). The average annual change in the index Rees-Eisenck in the adolescent first year cadets is (-2,56 ± 0,21), in the pupils and students it is (-0,22 ± 0,14). The annual change in the index Rees-Eisenck in the first year cadets is reliably lower by 2.34 compared with the pupils and students (t = 9,47 t = 5,25 and at r≤0,05) respectively. The average annual change in the Pigna index in adolescent first year cadets is (-1,42 ± 0,20), in the students and pupils it is (-0,28 ± 0,20) and (-0,48 ± 0, 12) respectively. Thus Pigna index annual change in the first year cadets is reliably lower by 1.14 compared with students (t = 3,74 at r≤0,05) and by 0.94 compared with pupils (t = 3,98 with p ≤0,05).

There was no reliable difference in the annual change in the index of body length proportionality in the first year for all groups of young men.

Conclusions. When comparing the annual changes in the indice of harmonious physical development of cadets, pupils and students in the first year of studies, we identified the growth dynamic in most average parameters of the cadets, so that their annual changes were reliably higher than in the pupils and students:

10 out of 11 (90.1%) of values between cadets and pupils, 8 of which were in the cadets' favour (the annual change in body mass index, proportionality of the chest, shoulders, pelvis, upper and lower extremities, and sexual dimorphism and corpulence index (Rohrer)) and 2 were in the pupils' favour (annual change in Rees-Eisenck and Pigna indices);

9 out of 11 (81.8%) values between the cadets and students 7 of which were in the cadets' favour (annual change in body mass index, proportionality of the chest, shoulders, upper and lower extremities, and sexual dimorphism, corpulence index (Rohrer)) and 2 – in the students' favour (annual change in Rees-Eisenck and Pigna indices).

3 out of 11 (27.3%) values between the pupils and students, all of which were in the students' favour (corpulence index (Rohrer), proportionality of length of the upper and lower limbs).

The annual changes in the index of harmonious physical development of the second year cadets, pupils and students, followed by a comparison of annual changes in the conditions of the educational process in different schools also need further studying.

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PECULIARITIES OF COGNITIVE MODULATION INFLUENCE ON IMPROVEMENT OF VISUAL ACUITY IN SPORTSMEN OF THE YOUNG AND MIDDLE AGE

Abstract. *A complex analysis of 85 children - sportsmen for the purpose of studying efficacy of the method of cognitive modulation in the treatment of amblyopia was carried out in this article. The method of cognitive modulation enables to stabilize visual functions on a high level in the majority of patients (67-75%). The method of video-computer autogenic training is characterized by the lack of contraindications and shows good results.*
Keywords: *amblyopia, cognitive modulation, visual analyzer.*

Introduction. Owing to the visual organ we receive information about the world around. Visual analyzer is bound with the whole organism by the significant quantity of anatomical and physiological mechanisms, therefore, functional or morphological changes of the visual organ are often caused by common diseases. The majority of pathological eye changes it is the manifestation of common or systemic diseases. The state of visual acuity and visual field provides visual perception of the objects, orientation in space and in case of their professional assessment enables to give functional characteristics of visual analyzer under pathologies, occupational selection, working examination and scientific investigations.

The problem of amblyopia in sportsmen of the young and middle age represents itself a serious medical and social problems. To solve these problems optic correction and various pleoptic programs are actively used in up- to - date ophthalmology [1;2;5-8].

Nowadays due to severe visual overexertion in young people the methods of treatment using the ways of external feedback started to be widely attracted in practical medicine Perspective in this direction is the method of cognitive modulation of the visual acuity which is brought into effect by means of hardware complex "Amblyokor". In its base there is video-computer autogenic training which promotes the renewal by the nervous system of the control of the processes, taking place in visual analyzer, and intensifies brain capacity to restore accuracy of visual image.

The aim of the article is substantiated and evaluated by the efficacy of the method of cognitive modulation of visual acuity in the treatment of the students and sportsmen afflicted with amblyopia.

Pathological changes of the eye in the sportsmen of the children's and youthful age are observed not so often because of the severe medical selection when admitting to the trainings. According to the observations of ophthalmologists two diseases, in general, such as conjunctivitises and pathological changes of the retina are detected in the sportsmen of the given age group [3; 4]. If inflammation of the conjunctiva is associated with the conditions of physical trainings, then pathological changes of the retina (hemorrhages, exfoliations, etc.) - with the specific features of exercises and physical activities in either kind of sports. To the latter ones it is possible to refer frequent excessive exertions (barbell, wrestling), frequent position of the body head foremost

(gymnastics and others), cuffs to the head (boxing), which may lead to a significant visual deterioration or even its total loss.

Changes of the retina, associated with great myopia, hyperopia, astigmatism, strabismus, amblyopia, spasm of accomodation, hypertension and intense overstrain of a sportsman may be the contributing factors before the onset of such dangerous ocular diseases. One of the most effective, absolutely safety and painless way of treatment of ophthalmopathology in the sportsmen of the children's and adolescent age is timely use of physiotherapeutic methods of treatment.

Medication with medicinal preparations under certain conditions is undoubtedly justified but for all this there occurs reliability of undesirable and unforeseen side-effects. Surgical interference, as a rule, is an emergency measures in the process of treatment. Therefore, physiotherapy, being tested not by a hundred years, remains to be the safest and prevalent direction in the treatment and rehabilitation [6; 8; 10].

Objective: To ascertain the health condition of the students and sportsmen. To prove topicality of using health – supporting technologies in the process of teaching students.

Materials and methods. The authors have carried out complex analysis of the data of the 32 children (control group) with amblyopia of various genesis, who received traditional pleoptic treatment, and 53 children (group under study) who underwent multimodality therapy using hardware complex '' Amblyokor'' of ophthalmologic outpatient clinic '' Luxor Optics" . All children - sportsmen of the control and group under study were aged from 12 to 18 years. 19 children (59%) with refractive amblyopia, 11(34%) with dysbinocular and 2 children (7%) with amblyopia of obscure origin were revealed among 32 children of the control group (15 boys and 17 girls). When examining the given group amblyopia of a mild degree was observed in 17 (53%) children, medium degree - 12 (38%) and high degree - 3 (9%). Pleoptic medication included different kinds of photo-, colour- and lazerstimulation. Acuity of vision and field of view were determined in all patients before and after the treatment.

In ophthalmological outpatient clinic 53 children-sportsmen of the group under study with amblyopia of different genesis: refractive amblyopia -39 (75%), dysbinocular - 10(18%) amblyopia of obscure origin - 4 (7%) underwent hardware treatment using complex "Amblyokor".

The term of treatment according to the kind and degree of amblyopia constituted 10-15 procedures using the apparatus "Amblyokor".

Special attention was paid to the form of refraction when choosing the regimen of treatment. The regimen "relaxation" was used when detecting myopic refraction and mixed astigmatism, and the regimen "activation" was used in case of hypermetropic refraction and hypermetropic astigmatism.

Visual acuity was determined according to the Sivtsev- Golovin’s, Orlova's tables and Landolt's rings with or without optic correction. Indices of visual acuity in children of the group under study were used as the control of the treatment efficacy. The analysis of the results of the treatment of 53 children (19 boys and 34 girls) using hardware complex "Amblyokor" in 3 and 6 months after therapy was carried out by us.

In the group under study amblyopia of a mild degree was observed in 27 (51%) children, medium- in 21 (40%) and high degree - in 5 (9%) children.

Results and discussion. Data of the retrospective analysis of the results of pleoptic treatment of children- sportsmen using traditional methods and therapy by means of hardware complex "Amblyokor" are shown in table 1. According to the data given in the table, in children receiving pleoptic therapy, the average visual acuity without correction increased by 0.05 and with correction by 0.15. Respectively, the structure of amblyopia has changed in degrees. Thus, amblyopia of a high degree decreased by 1.5 times (from 15% to 19%), medium- by 2 times (from 29 to 14%), and a portion of amblyopia of a mild degree increased by 1.5 times (from 50 till 75%).

Analyzing the data of the table, concerning

Table

	Control group N=32 (Children- received pleoptic treatment) M ±m		**Group under study N=53 (Children – underwent the treatment using apparatus "Amblyokor") M ±m**		**P**
Medium visual acuity	Before treatment	After treatment	Before treatment	After treatment	
Without correction	0,07±0,02	0,1±0,05	0,15±0.1	0,45±0,25	>0,05
With correction	0,1±0,05	0,25±0,15	0,2±0,15	0,65±0,3	>0.05

the children who underwent the treatment on complex apparatus "Amblyokor" it is possible to ascertain that due to the hardware treatment medium visual acuity without correction increased by 0.3, and with correction by 0.45.

As a result of multimodality treatment medium visual acuity increased from 0.2 +_0.15 (before medication) till 0.65+_0.3 (after medication).

Three months later after the hardware treatment visual acuity remained the same in 75% children, and in 6 months - in 67%.

In other cases, visual acuity reduction without correction and with the optic correction varied from 0.05 to 0.4. For the most part these were the children with obscurate or dysbinocular amblyopia of a very high and high degree, what, in our opinion is explained by the availability of incorrect (not central) fixation, absence of the constant correction in case of one-sided lesion.

Conclusions. 1. This research corroborates the necessity of the search of new methods of amblyopia treatment using modern technologies.

2. Method of cognitive modulation of visual acuity enables to stabilize visual functions on a rather high level in the majority of patients (67%-75%).

3. The preference of video-computer-autogenic training method is the absence of side- effects, simplicity of the procedure and good effectiveness.

4. Despite of using up-to-date methods of pleoptics the treatment of amblyopia remains not completely solved.

Perspectives of further investigations. The obtained and cited results are the scientific ground for further studying cognitive modulation influence in order to improve visual acuity in the students and sportsmen, who subject the visual organ to intensive overloading.

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STUDY OF ANATOMICAL STRUCTURES CONTOURS IN PROBLEMS OF MORPHOMETRIC ANALYSIS

Abstract. *The work deals with the contours of anatomical structures, namely, the lateral ventricles of the brain. We have analyzed the contours of the lateral ventricles at different horizontal sections of tomographic images. We have shown the possibility and the need to use geometric data of these structures geometry while analysing tomographic images.*

Key words*: brain, computed tomography, contour analysis, lateral ventricles*

Introduction. The study of morphometric characteristics of anatomical structures is an important part both in statistical diagnosis of structural abnormalities [1-3], and in determining their morphological characteristics, and, consequently, the formation of understanding the causes of modification and the consequences to which it leads or may lead. In addition, the morphometric study is not only a source of knowledge for health professionals, but also for technicians who develop tools for analyzing introscopic images, development of computer systems planning, and more.

Thus, the study of morpho metrical structural features and both personalized and ethno-personalized peculiarities is an important medical and technical task [4-5].

Objective: based on the above, the purpose of the paper is to analyze the possibility of using computational methods for morphometric analysis of anatomical structures, the example of which are the lateral ventricles of the human brain.

Materials and methods. The study was conducted at the Department of operative surgery and topographical anatomy of Kharkiv National Medical University. As the input data we used CT sections of the human brain that are presented in the format DICOM, obtained from a computer tomograph Toshiba Aquilion 16. Tomographic imaging was conducted at a supply voltage on the tube - 120 kV and current - 300 mA. The distance between the sections was 4 mm.

The input section is a matrix of x-ray intensity (Fig. 1).

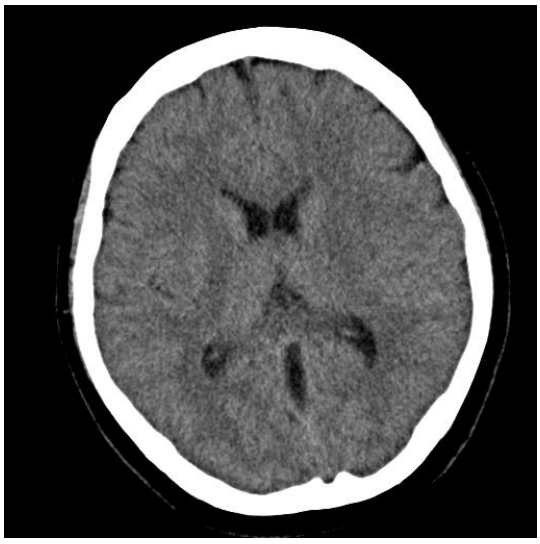


Fig. 1. A sample of the experimental tomographic section of the brain

The structure under study (the left lateral ventricle of the brain), on the tomographic cut was selected and presented as a connected contour [6]:

$$C = \left\{ P_1, P_2, \ldots, P_n \middle| P_i \in \square^2 \right\}, \quad (1)$$

where C is the contour;

P_i – contour vertex;

n – number of vertices in the contour.

Figure 2 shows the contours of the structure under study and the corresponding tomographic sections. Depending on the required details, we used n of vertices for encoding in the corresponding section.

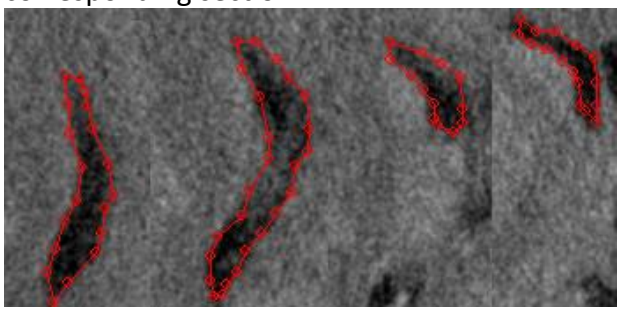
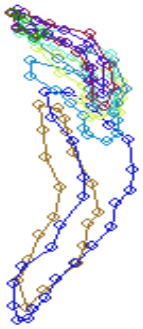
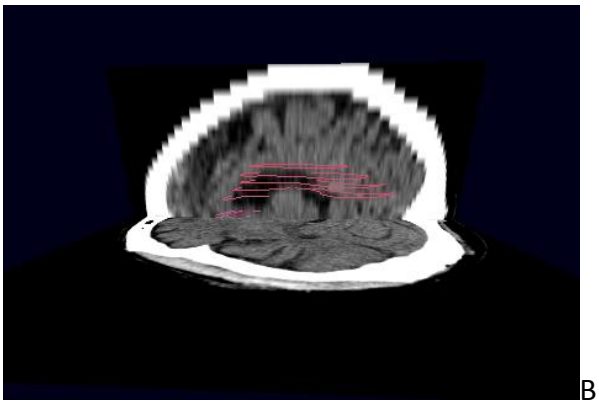


Fig. 2. Sample contours of the structure under study

In order to show the relative position of the contours, Fig. 3 presents the contours one behind the other. As you might guess from the picture, the center of ventricular gravity shifts . We also present the three-dimensional visualization below (Fig. 3 b).



A



B

Fig. 3. Visualization of the left ventricle contours: a – visualization overlay; b – three-dimensional visualization

Based on the above, a calculation of the center of mass (M) was carried out according to the following expression: :

$$M = \frac{\sum_{i=1}^{n} P_i}{n}, \quad (1)$$

Fig. 4 shows an example of the center of mass of an experimental structure in different sections

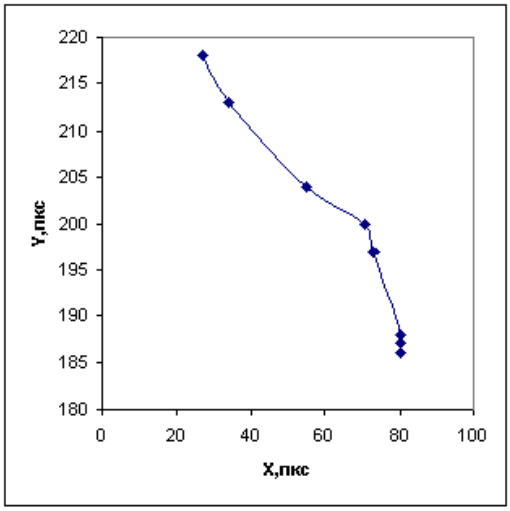


Fig. 4. Example of the coordinates of the center of the left ventricle offset

We also discovered, by means of contours differentiation, that with the angle of curvature of about 120 ° ± 10% the contour passes in the anterior horn. In addition, the ratio of width to height of the contour is decisive in determining the level of a cut. For instance, the ratio in the anterior horn is 1: 1 ± 10%.

Results and discussion. Thus, we carried out an analysis of the contours of the lateral ventricles of the human brain based on 20 cases. The results of the study indicate the possibility and feasibility of using computational methods to analyze geometrical parameters of the contours of anatomical structures.

Conclusions. 1. The efficiency of the use of computational methods in the study of the contours of anatomical structures on the example of the lateral ventricle of the brain has been shown.

2. The results are indicative of the limited spatial location of the lateral ventricle. In moving from the top downwards the center of gravity gets shifted laterally and rostrally. These

data should be used in the implementation of specialized methods of analysis and segmentation of tomographic data, namely, in determining the initial contours, which grow longer later.

3. Using morphometric techniques combined with computational methods for tomography research findings is a very effective and informative source that allows us to apply them in the analysis of spatial and morphometric parameters both in separate structures, and in their agregations.

Prospects for further research. A promising area of future research is the isolation of countours in all brain structures and development of a generalized model of reciprocal positioning of these structures, taking into account both ethnicity and age data. Another important element of the study is to analyze not separate contours, but three-dimensional structures that should be taken into account. In addition, the use of this model for automated segmentation of the structures of the human brain is to increase the quality of both diagnosis and computer planning of neurosurgical interventions.

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CHANGES OF GLUTHATIONE SYSTEM PARAMETRS IN BLOOD OF ALLOXAN DIABETIC RATS UNDER THE INFLUENCE OF MELATONIN IN CONDITION OF LIGHT AROUND-THE-CLOCK

Abstract. *Insertion of melatonin for 7 days helped to reduce 1,7 times basal glucose level in the group of animals with overt diabetes in condition of light around-the-clock. Activity of glucose-6-phosphate dehydrogenase, glutathione peroxidase and glutathione reductase in the blood of rats with overt diabetes was on 45%, 32%, and 30% respectively lower than in control rats that were under artificial equinox. In rat blood with overt and latent diabetes occurred reduction of reduced glutathione content on 23% and 42% respectively compared with those of control. Insertion of melatonin to diabetic rats helped in normalization of parameters.*
Key words: *melatonin, alloxan diabetes, glutathione system, blood, rats, light around-the-clock.*

Introduction. Melatonin influences diabetes and associated metabolic disturbances. It acts as an antioxidant, neutralizing harmful oxidative radicals, and it is capable of activating certain antioxidant enzymes [3, 2]. It is a powerful antioxidant that easily crosses the cell membranes and blood-brain barrier [10, 17]. It acts as a direct scavenger of OH·, O2, and NO [12, 13].

The diabetogens, alloxan and streptozotocin, lead to selective destruction of beta-cells through their accumulation in these cells, where they induce the generation of ROS. Beta-cells are very susceptible to oxidative stress because they possess only low-antioxidative capacity. Results suggest that melatonin in pharmacological doses provides protection against ROS. Finally, melatonin levels in plasma, as well as the arylalkylamine-N-acetyltransferase (AANAT) activity, are lower in diabetic than in nondiabetic rats and humans. In contrast, in the pineal gland, the AANAT mRNA is increased and the insulin receptor mRNA is decreased, which indicates a close interrelationship between insulin and melatonin.

Oxidative stress plays a pivotal role in the development of diabetes complications, both microvascular and cardiovascular [1, 16]. The increase in glycoxidation and lipoxidation products in plasma and tissue proteins suggests that oxidative stress is increased in diabetes [6, 9, 5].

Exogenous melatonin normalizes impaired due alloxan diabetes and tetrachlormethane hepatitis glucose-6-phosphatase activity in rat liver [19].

It has been ascertained [7] that an alloxan monohydrate administration to rats results in a significant elevation of the level of basal glycemia in the blood, and an increase of the activities of lactate dehydrogenase and glucose-6-phosphatase in the liver, however a decrease of the glycogen content and the activity glucose-6-phosphate dehydrogenase was in a direct dependence on the presence of hyperglycemia. The established changes of the indices of the carbohydrate metabolism in animals with alloxan diabetes turned out to be more marked under the conditions of permanent lighting than with equinox or permanent darkness. With a 7-day introduction of melatonin an improvement of the state of carbohydrate metabolism was marked and that was accompanied with a normalization of the indices, apart from the activities of glucose-6-phosphatase in the liver

which is normalized in case of a 42-day administration that was also characterized by a normalization of the level of glycosylated hemoglobin in the rat's blood [18].

Objective: to determine the influence of one-week melatonin infusion on basal levels of glucose, reduced glutathione (GSH), activity of glucose-6-phosphate dehydrogenase (G6PD), glutathione peroxidase (GPx) and glutathione reductase (GR) in the blood of alloxan diabetic rats under conditions of constant light.

Materials and methods. The experiments were carried out on 58 sexually mature male albino, not thoroughbred rats with the body mass – 0,18 – 0,20 kg. Alloxan diabetes was evoked via injecting the rats with a 5% solution of alloxan monohydrate intraperitoneally in a dose of 170 mg/kg following a 24 hour period of fasting [11]. The melatonin preparation was used in the research (the manufacturer – "Sigma", USA). The animals were divided into 6 subgroups: 1) rats (the control group) that were under artificial equinox (Light : Darkness = 12 : 12); 2) rats that where under conditions of constant light (L : D = 24 : 0); 3) alloxan diabetic rats (L : D = 24 : 0); 4) alloxan diabetic animals which were introduced the melatonin preparation intraperitoneally in a dose of 10 mg/kg at 8 a. m. daily during 7 days starting with a 5-th 24 hour period after the injection of alloxan (L : D = 24 : 0); 5) alloxan diabetic rats with latent (basal glycemia < 6,9 mmol/l) diabetes (L : D = 24 : 0); 6) rats with latent diabetes which were introduced the melatonin preparation intraperitoneally in a dose of 10 mg/kg at 8 a. m. daily during 7 days starting with a 5-th 24 hour period after the injection of alloxan (L : D = 24 : 0). Blood was taken from the tail vein evaluate the BG level with the use of One Touch Ultra (LifeScan, USA). On the third day the death of a part (50%) of the alloxan diabetic animals was observed. Rats were sacrificed at the twelfth day of the experiment accordance with the ethical treatment of animals. Determinations of GSH, activity G6PD, GPx and GR in the blood were by standard methods [8]. Statistical analysis of results was conducted by Student's test. Sufficient level considered probability differences $r \leq 0,05$.

Results and discussion. Staying animals in lighting conditions around the clock throughout the week was accompanied by a tendency to increase in basal blood glucose by 18% from baseline this indicator on the 4-th day of the experiment (figure).

Insertion of melatonin for 7 days helped to reduce 1,7 times compared with the baseline, basal glucose level in the group of animals with overt diabetes, indicating its hypoglycemic action.

Probable reduction of melatonin synthesis and secretion under conditions of constant illumination coupled with reduced sensitivity to insulin, reduces the activity (table) of G6PD in control rats and rats with diabetes.

Under these conditions there was no typical increase in activity of G6PD in the group of animals with latent diabetes [18], but rather there was a decline of this indicator compared with those of control rats, provided equinox.

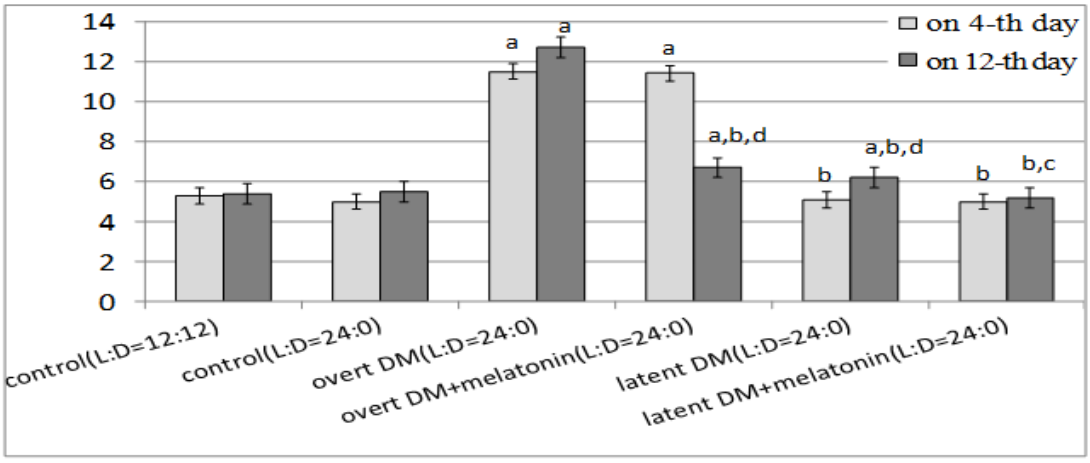

Figure. The level of basal glycemia (mmol/l) in blood of rats, (n=6, x±Sx) : 1. a, b, c - changes are reliable (p≤0,05). 2. a - concerning intact rats; b - concerning rats with overt diabetes; c – concerning rats with latent diabetes; d – concerning indices on 4-th day.

Table

Influence of melatonin on the indices of glutathione system in the blood of alloxan diabetic rats (x±Sx, n=6)

Indexes / Indexes	Glucose-6-phosphate dehydrogenase, mkmol/min×g Hb	Glutathione reductase, mkmol/min×g Hb	G-SH, mkmol/ml	Glutathione peroxidase, mkmol/min×g Hb
Control group (L:D = 12:12)	5,5±0,16	4,2±0,24	6,4±0,38	152,4±10,4
Control group (L:D = 24:0)	5,8±0,26	4,4±0,18	6,8±0,40	155,0±12,3
Overt diabetes (L:D = 24:0)	3,0±0,28[a]	2,9±0,22[a]	3,7±0,34[a]	103,4±12,4[a]
Overt diabetes+ melatonin (L:D=24:0)	5,6±0,45[b]	4,4±0,28[b]	6,6±0,42[b]	155,2±11,0[b]
Latent diabetes (L:D = 24:0)	5,0±0,44[b]	3,7±0,26[b]	4,9±0,40[a,b]	140,6±12,6 [b]
Latent diabetes + melatonin(L:D=24:0)	6,2±0,27[b,c]	4,5±0,24[b,c]	6,8±0,44[b,c]	162,4±11,0[b]

1. a, b, c - changes are reliable (p≤0,05).
2. a - concerning intact rats ;
   b - concerning rats with overt diabetes;
   c – concerning rats with latent diabetes.

Activity of G6PD, GPx and GR in the blood of rats with overt diabetes was on 45%, 32%, and 30% respectively lower than in control rats that were under artificial equinox. In rat blood with overt and latent diabetes occurred reduction of reduced glutathione content on 23% and 42% respectively compared with those of control. We know [3, 4, 15] that pinealectomy, same as its hypofunction caused by permanent lighting, leading to decreased synthesis and secretion of melatonin, which causes insulin resistance and reduce the gene expression of glucose transporter GLUT 4, 2, 1. It is logical that the activity of G6PD is reduced under conditions of constant illumination during diabetes mellitus, whether an administration of melatonin leads to increased its activity.

Insertion of melatonin to diabetic rats helped in normalization of parameters that we studied.

Under the influence of melatonin increase activity of G6PD in the blood of rats may be due to the increasing number of substrate for G6PD (stimulating the flow of glucose into cells and its phosphorylation) and direct action [14].

According to our investigations the introduction of melatonin intraperitoneally in a dose of 10 mg/kg at 8 a. m. daily during 7 days to alloxan diabetic rats under conditions of constant light is conducive to a decrease in them of the level of fasting glucose, as well as – a stabilization of the indices of the body's antioxidant defense (glucose-6-phosphate dehydrogenase, glutathione peroxidase, glutathione reductase).

Conclusion. Under conditions of permanent light exogenous melatonin activates antioxidant glutathione dependent enzymes in the blood of alloxan diabetic rats that ultimately provides increased content of G-SH - one of the main endogenous antioxidant.

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USING DUAL-FREQUENCY ULTRASOUND IN INTENSIFYING THE STAGE OF MINERALIZATION OF PLANT AND ANIMAL FOODS

Abstract. *A combined action of high and low frequencies ultrasound (US) for the intensification of wet mineralization of various foods has been studied. It is shown that the use of dual-frequency ultrasound can increase the degree of extraction and allows using one oxidizing agent for all foods. It allows creating a unified technique for the analysis of various alimentary products.*
Key words*. Dual frequency ultrasound, acid mineralization, metrological characteristics.*

Introduction. The most prolonged stage of food analysis is the sample preparation, in particular, its mineralization, which takes more than 90% of analysis time [1-5]. To intensify the wet mineralization processes, the use of ultrasound (US) with a frequency from 18 to 100 MHz has been studied. In this case the time for the mineralization reduced by 5-20 times [2].

We had studied a combined action of high and low frequency ultrasound on the destruction of organic compounds of common salt and brines before. It was shown that the use of dual-frequency ultrasound can reduce energy consumption and improve the analysis of metrological characteristics of the results [6-8].

Objective: to study a combined action of з high and low frequency ultrasound in order to in-tensify the wet mineralization processes of foods.

Materials and methods. To create low-frequency oscillations we used tubular magnetostriction radiators, in-side which a test tube with the test solution was installed. The upper part of the tube was covered with a ring-shaped piezo-radiative of PZT-type 19 made of lead zirconate-titanium using fluoroplastic seals.

The unified method of determination of lead and cadmium in plant and animal foods.

An animal product weighing 0.50 g or plant one of 1.00 g is placed into a test tube and 5 ml of hydrogen peroxide (90%) is added. The tube is placed into a mag-netostriction radiator, and the US with the frequency of 22 kHz and 1 MHz with an intensity of 2.0 and 2.5 W / cm2, respectively is used. Ultrasonic exposure time in analyzing plant products is 2 minutes, and in the analysis of animal ones it is 3 min.

To the mineralizer that we obtain, 1 ml of 0.01 mg / l of solution Pd(NO3)2 is added solved with bidistilled water until the volume is 10 ml and the content of lead and cadmium is determined by non-flame atomic absorption method using the time-temperature program given in [6].

Results and discussion. The analysis results are shown in the Table. The studies found that when using a combined action of ultrasound of high and low frequencies the degree of extraction of lead and cadmium was slightly higher (98-100%) than when using the low-frequency ultrasound alone (93-96%). We have found optimal parameters of the US: high frequency - 1 MHz low-frequency - 22 kHz, high intensity 2.0 W / cm^2, and the low-frequency - 2.5 W / cm^2, exposure time is 3 minutes.

The higher efficiency of the simultaneous action of ultrasound with high and low frequencies is due to the peculiarities of the formation and collapse of cavitation bubbles, in which most of (over 90%) small spherical cavitation bubbles are formed, the collapse of which leads to the most effective intensifying of

Table

The results of determination of lead and cadmium in foods

Sample name	Found, mg/kg; (n=6)							
	By using our method				By using the standard method [1, 9]			
	Pb	S_r	Cd	S_r	Pb	S_r	Cd	S_r
Meat (pork)	0,195	0,06	0,037	0,08	0,192	0,09	0,035	0,10
Milk, fat 2.5%	0,092	0,07	0,013	0,07	0,095	0,10	0,012	0,11
Milk, fat 3.2%	0,114	0,07	0,020	0,07	0,116	0,10	0,018	0,10
Cream fat 10 %	0,128	0,07	0,021	0,06	0,134	0,10	0,019	0,09
Cream fat 20 %	0,160	0,06	0,020	0,07	0,155	0,09	0,022	0,10
Wheat groats, s/q	0,150	0,07	0,014	0,08	0,153	0,10	0,013	0,09
pearl barley	0,066	0,07	0,041	0,07	0,061	0,10	0,036	0,09
buckwheat	0,085	0,07	0,053	0,06	0,081	0,10	0,048	0,10
bread «Donbass New»	0,159	0,08	0,035	0,08	0,153	0,10	0,030	0,11
Bun with jam	0,217	0,07	0,019	0,08	0,211	0,10	0,018	0,09
Instant coffee	0,114	0,06	0,029	0,08	0,114	0,09	0,027	0,09
Apples	0,157	0,06	0,014	0,08	0,153	0,09	0,012	0,10
Cabbages	0,084	0,07	0,007	0,08	0,085	0,09	0,008	0,10
Apricot juice	0,079	0,07	0,009	0,08	0,071	0,11	0,011	0,10
Beer Donetsk, 14%	0,129	0,07	0,019	0,08	0,122	0,09	0,021	0,10

sonochemical reactions underlying the accelerating processes of mineralization [8].

Conclusions. Thus, the use of a combined action of high and low frequencies ultrasound can increase the degree of extraction, allows using one oxidizing agent for all foods that allows you to create a unified technique for the analysis of alimentary products. We have developed a unified technique for determination of lead and cadmium in different foods. The technique correctness was checked by testing the same samples using the standard method.

Prospects for further research. We are planning a study on the use of dual-frequency ultrasound for dry mineralization, which has advantages over the wet one – there is no need in using solvents and the analysis is easy to perform.

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TOPOGRAPHIC AND ANATOMIC RELATIONS BETWEEN THE TRUE PELVIS ORGANS IN HUMAN FEMALE PREFETUSES

Abstract. *While studying horizontal sections of prefetuses with 17,0-19,0 mm of CRL we found out that the ovaries lie in the cavity of the large pelvis almost horizontally. The right ovary is 374-380 microns long, 198-204 microns wide, the size of the left ovary is: 506-510 microns and 176-180 microns respectively. In the prefetuses with 38,0-42,0 mm of CRL the ovaries separate from the primary kidneys, a convex surface of the ovaries is projected into the body cavity. At this stage of the intrauterine development the pelvic cavity only contains the caudal rectum. In the prefetuses under study with 74,0-79,0 mm of CRL the ovaries are mostly upright. The right ovary id oblate. During the 3rd month of the intrauterine development (9th -12th week, crown-rump length of the fetuses is 33,0-80,0 mm) there is a further differentiation of the muscles of the perineum, which is closely linked with the development of external sexual organs.*
Key words: *ovaries, pelvis organs, prefetuses, human.*

Introduction. According to the literature review, an integrated study of the growth of walls and organs in the true pelvis was passed by. There are some fragmentary findings on the development of bones and muscles of the pelvis, some internal organs and the perineum [1-7]. At the same time a large number of defects in this area, which are often combined together have been described. For instance, Koppler-Norenil K. [8] after studying 14 cases of combinations of defects in the pelvis and its walls, suggests looking for pathogenesis of these malformations during embryonal development of the cloaca and the urorectal septum.

Objective: To establish topographic and anatomic features and further development of the walls and the contents in the true pelvis during the prefetal period of the prenatal human ontogenesis.

Materials and methods. By using the methods of histological research, we have studied 10 series of successive sections of prefetuses with 14,0-80,0 mm of CRL.

Results and discussion. It was established that in the early prefetal period (the 7th week, the prefetuses with 14,0-20,5 mm of CRL) the processes of transformation of the embryonal cloacal part are intensively going on. The urorectal fold that appears in the corner between the allantois and the hindgut at the end of 6 weeks, is growing into the lumen of the cloaca towards the cloacal membrane and reaches the latter in prefetuses with 16,0-17,0 mm of CRL, becoming the urorectal membrane. The membrane is positioned frontally and divides the cloaca into two parts: the dorsal one, that is, the primary rectum and the ventral one – the urogenital sinus. In the same way the cloacal membrane divides into two sections: the posterior one – the rectal (anal) membrane and the anterior one – the urogenital membrane (urogenital diaphragm).

While studying horizontal sections of prefetuses with 17,0-19,0 mm of CRL we found out that the ovaries lie in the cavity of the large pelvis almost horizontally. The right ovary is oval with concave mesenteric edge, which is adjacent to the primary right kidney and is connected with it by two cruses, the medial and lateral ones. Anteriorly to the ovary the right elongated lobe of the liver lies and it is separated from the gonad by a fissure. In the liver area, directed towards the gonads, there is a depression coinciding with the convex surface of the sexual gland. Parenchyma of the gonad is divided by fissures of different direction into separate areas which are mostly round and oval. The left elongated oval ovary is connected, like the right one, by short mesenchymal cruses with the primary kidney, which is located behind it. Anteriorly to the gonad, all way along it, a rudiment of the pancreas lies. Between the

primary kidneys there is a fold of the peritoneum, whose initial departments are separated, both on the right and on the left by fissures from the gonads rudiments. The right ovary is 374-380 microns long, 198-204 microns wide, the size of the left ovary is: 506-510 microns and 176-180 microns respectively.

In the sagittal sections of studied prefetuses with 22,0-26,0 mm of CRL, the ovaries are mostly rounded. Anteriorly to the left ovary there is a rudiment of the pancreas, and that of the liver lies anteriorly to the right ovary. The primary kidneys to which both the right and left ovaries are connected by one mesenchyme crus are located behind the ovaries. The considerably sized adrenals lie over the ovaries. The ovarian parenchyma, as in the previous stage of the development, is divided by variously directed fissures into separate areas which are mostly round, oval and elongated-oval.

In the prefetuses with 38,0-42,0 mm of CRL the ovaries separate from the primary kidneys, a convex surface of the ovaries is projected into the body cavity. In this age group the length of the right ovary prevails over the length of the left one, whereas the left ovary is wider than the right one. The separation of the ovarian parenchyma into some round, oval and elongated-oval parts becomes much more visible, indicating a further process of their differentiation. At the same time there is an intensive development of ovarian blood vessels. In the prefetuses with 50,0-60,0 mm of CRL the true pelvis as an anatomical structure begins to form. At this stage of the intrauterine development the pelvic cavity only contains the caudal rectum.

While studying a human prefetus with 70.0 mm of CRL, we found some features of the internal female reproductive organs syntopy. The right elongated fusiform ovary lies almost vertically in the cavity of the large pelvis. There are lateral and medial surfaces, curved free anterior and concave posterior mesentery edges in the ovary. The uterine end of the ovary is closely adjacent to the back surface of the uterus anteriorly and to the anterior-lateral surface of the rectum posteriorly. The tubular end of the ovary is adjacent to the suspensory ligament of ovary and is located at the level of the iliac crest. The right ovary is 6.0 mm long, 3.1 mm wide and 2.2 mm thick. The uterine and tubular ovarian ends are rounded. The ovarian mesentery reaches 4.6 mm long, the ligament of ovary – 1.1 mm long. The ileal loops are closely adjacent both to the lateral and to the medial surfaces of the ovary, forming a kind of place for the right ovary. The left elongated fusiform ovary lies in the large pelvis almost horizontally. We distinguish between the front and back surfaces, pointed upper free and lower mesentery edges in the ovary. The uterine ovarian end is closely adjacent to the back surface of the uterus anteriorly and to the front surface of the rectum posteriorly. The tubular pointed end of the ovary touches closely the proximal loop of the sigmoid colon. The uterine ends of the two ovaries are adjacent to each other behind the uterine fundus. The ovary is 6.8 mm long, 3.0 mm wide and 2.1 mm thick. The mesentery of the ovary is 4.8 mm long, the ligament of ovary is 1.2 mm long. The right uterine tube is S-shaped and 6.5 mm long, with the same diameter, except the funnel, which was slightly dilated. The initial section of the tube is adjacent to the lateral surfaces and the rear edge of the right ovary. The left uterine tube lies horizontally according to the ovary placement and is adjacent to the lower edge of the left ovary. The thickness of the uterine tube along its whole length, except for a larger funnel is the same. The uterus is flattened in the anteroposterior direction, 1.1 mm thick at the bottom. The right ureter can be found behind the mesentery of the right ovary, the left ureter is closely adjacent to the back surface of the ovary at the border between its medial and central parts.

In the prefetuses under study with 74,0-79,0 mm of CRL the ovaries are mostly upright. The right ovary id oblate. We can distinguish between lateral and medial surfaces, front and rear edges, rounded tubular and uterine ends, the fallopian tube is adjacent to the right ovary surface, and the rectum to its medial surface. The right ovary is 5,8 ± 1,5 mm long, 2,6 ± 1,1 mm wide and 1,8 ± 1,2 mm thick. The left ovary is elongated and crescent-shaped. It has anterior-lateral and posterior-medial surfaces, medial and lateral edges, pointed tubular and uterine ends. The fallopian tube is adjacent to the anterior lateral surface of the ovary, and the rectum touches its concave posterior medial surface. The left ovary is 4,9 ± 1,2 mm long, 2,4

± 1,0 mm wide and 1,7 ± 1,1 mm thick. The suspensory ligaments of ovary are fused with the lumbar fascia above the entrance to the true pelvis, and in its thickness they reach the ovarian vessels. The ovarian ligament, being 1,1 ± 0,9mm long is attached to the right side of the uterus below the uterine tube. The mesentery of the ovary is 3,4 ± 1,8 mm long and 0,8 ± 0,6 mm wide. The right uterine is winding in shape with no clear boundaries between the respective parts; it is surrounded by the serous membrane on all sides.

The end of the second month of the intrauterine development (8th week, prefetuses with 21,0-30,0 mm of CRL) is characterized by onset and partial resorption of the urogenital and anal membranes. With the appearance of these apertures the area of the perineum can be seen better. Cloacal sphincter also divides into two sections: urinary and anal ones. Due to the fact that the development of the external sexual characteristics is behind the development of the gonads, during this period there still is homology of the rudiments of the perineum muscles. The space between the bones of the pelvis, rectum and the urogenital sinus being formed is the future recto-gluteal fossa filled with undifferentiated mesenchyma, where some rudiments of vessels and nerves can be identified.

During the 3rd month of the intrauterine development (9th -12th week, crown-rump length of the fetuses is 33,0-80,0 mm) there is a further differentiation of the muscles of the perineum, which is closely linked with the development of external sexual organs. We can identify the urogenital and pelvic diaphragms even in the prefetuses with 50,0-56,0mm of CRL. The development of the urogenital organs in the area of the urogenital sinus leads to the differentiation of the urogenital sphincter into separate bundles – the rudiments of the muscles of the urogenital diaphragm. For instance, from this sphincter in the prefetuses aged 11 – 12 weeks (50,0-80,0 mm of CRL) it is possible to detect some bundles that reach the pubis that we regard as the appearance of a rudiment of the musculus bulbocavernosus. Deep areas of the sphincter located around the distal part of the urogenital sinus remain circularly directed, the cells become elongated, they are located close to each other.

Conclusions. 1. In the prefetal period (prefetuses with 50,0-60,0 mm of CRL) the true pelvis as an anatomical structure is formed containing the caudal part of the hindgut.

2. Topographic and anatomic relations of the organs located at the entrance to the true pelvis are characterized by complexity and expressed dynamism in their formation.

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PROSPECTS OF SOLVING ENVIRONMENTAL PROBLEMS WHILE USING CADMIUM COMPOUNDS (literature review)

Abstract. *We have studied common trends in using cadmium compounds in the world and, according to our findings, there is not any decrease in their use. It was established that household nickel-cadmium batteries are the most significant group of products containing cadmium. It is shown that the main problem of recycling technologies is the problem of collecting used power sources.*
Key words: *cadmium compounds, used power supply, recycling, organization of collection.*

Humanity as a part of the Earth's ecosystem is increasingly feeling the effects of various xenobiotics that pollute the atmosphere and disturb the ecological balance. Therefore, more efforts are taken to solve the problems of ecological safety of new technologies and recycling accumulated waste, but these efforts, despite their magnitude, are not systemic, and therefore do not lead to significant results in a particular direction.

For instance, there are more than 20 metals in the UN list of the most dangerous pollutants. Three of them - mercury, lead and cadmium are attributed to global pollutants and are among the most common engineering materials. Moreover, the latter two metals do not have much prospects to be reduced in their use, as both lead and cadmium are indispensable electrotechnical materials. Furthermore, the use of cadmium, as a material for secondary power sources has not decreased, and the world amount of cadmium production has varied during the last decade at the level of 20 thousand tons per year [1].

An analysis of the industrial consumption of cadmium shows (Table. 1) that most of the cadmium is used for the production of secondary power sources. According to the forecasts of the International Association of cadmium (International Cadmium Association) the need for nickel-cadmium batteries in the world will grow, especially with the positive resolution of electric cars problems [2].

Cadmium from the chemical point of view, as well as zinc and mercury are the last representatives of the d-transition elements in the periodic table by D. Mendeleev with a completely filled d-orbital. That is why they are similar in properties both to their predecessors and to the elements of the main subgroup - namely, they are easily fusible and volatile. Their oxides, whose volatility is even higher, can be obtained directly in their interaction with oxygen.

Table
Cadmium consumption structure (in% of the total in terms of metal)

Years	2000	2003	2007	2011
Power sources	75.1	77.9	83.0	85.0
Cover	8.0	8.1	8.0	7.4
Pigments	12.0	12.1	7.0	6.5
Plastic	3.7	1.5	1.2	1.1
Other	0.9	0.6	0.8	0.8

It is considered [3], that the effect of toxic metals that causes severe consequences in the body occurs mainly in the following areas:

- ions Pb, Hg, Cd form strong complexes with amino acids and other biomolecules containing mercapto- (HS-) or alkylthio groups (RS). There is a so-called effect of mimicry when a false complex becomes similar to a conventional substrate, metabolism of major classes of nutrients gets disturbed;

- ions – pollutants replace biometal in metal containing enzymes, causing loss of their biological activity. For instance, as a result of replacing Zn by Pb, or Cd deactivation of

enzymes responsible for the synthesis of heme occurs, resulting in anemia;

- toxic effects of heavy metals is also related to a disturbed synthesis of cytochrome P-450 responsible for biodegradation of xenobiotics and endogenous biologically active substances that can cause profound metabolic disorders;

- In the presence of heavy metals ions the activation of peroxide and free radical oxidation occurs. As a result, some proteins, lipids and biomembranes are damaged.

But to fully evaluate the toxicity of a particular metal we should also take into account the form and the way the metal gets in the body. Because of their high capacity for hydrolysis, cadmium salts are poorly absorbed in the gastrointestinal tract. Cadmium poisoning is most frequently due to air pollution. Accumulating in landfills, which often burn, metals-pollutants get into the atmosphere already as toxic oxides. Thus, the main way of getting cadmium in the body is through the lungs, causing bronchitis, emphysema, anemia, kidney failure. It is also confirmed by the data [4], according to which health problems in smokers are caused by cadmium content in the cigarette smoke.

Considering the negative effect of cadmium compounds on the environment, a number of countries adopted regulations that reduce their harmful effects due to an increased content of cadmium, derived from processing cadmium-containing products, in the end products. Today, the following programs for the collection and recycling of waste batteries are known: RBRC - US and Canada, Battery Association - Japan and Collect NiCad - in the EU. Ukraine does not have such programs. But still, according to approximate estimates in Kharkiv, for example, each year up to 1 ton of nickel-cadmium batteries are thrown in landfills while replacing batteries in toys, mobile phones and various medical and household devices.

Thus, as the use of nickel-cadmium batteries threatens our environment but it cannot be stopped right now, it is especially important to suggest a system of storage and disposal of waste AA and AAA NiCd batteries.

From a technological point of view the utilization of waste nickel-cadmium batteries is not too difficult. An analysis of patent sources and known modern methods of processing raw materials containing cadmium and nickel, has shown that they are mainly hydro- and pyro-metallurgical techniques [5]. Moreover, for industrial power sources the recycling is supposed after the expiration date because of their large size. As for the household batteries, the problem is not only in processing technology but in recycling due to a large number of users.

This very fact becomes an obstacle to the introduction of technologies of recycling small (but numerous!) AA and AAA NiCd batteries.

Creating a state system for recycling a large quantity of a variety of waste industrial and household devices containing heavy, mostly toxic metals is an insistent need of our society. In Ukraine, such a program can operate in a system of environmentally sound recycling of domestic waste and can in the long run actually increase the ecological safety of our environment.

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EXPERIENCE OF OPTIMIZING TREATMENT OF ACUTE INTESTINAL DISEASES IN BUKOVYNA

Abstract. *The article dedicated to the study of efficiency application of contemporary probiotic «Probiz» as the component of the holiatry for patients with acute intestinal infection. Clinical and microbiological efficiency of probiz is well-proven as bacterial preparation, that could correct the abnormal intestine microbiocenosis from the first days of acute intestinal disease, caused by salmonella, shigella, citrobacter, proteus, pathogenic staphylococcus. «Probiz» could recommended in the holiatry of adult patients with different age and sexes in the case of acute diarrhea syndrome probably of infectious origin.*

Key words: acute intestinal disease, probiz, treatment, microbiocenosis.

Introduction. Globally, the proportion of infections transmitted by fecal-oral mechanism is probably the largest. The problem of acute intestinal infections (AII) and their treatment is closely connected with the microbiocenosis of intestines, which microflora is the primary target of the action of the exogenous flora and its factors of aggression. It is known that almost all patients with AII have varying degrees of the intestinal dysbiosis in the first days. That means clinical and laboratory syndrome with changes of qualitative and/or quantitative composition of microflora of a biotope, translocation of various representatives in their unusual biotopes, the development of metabolic and immune disorders and possible clinical symptoms with amplification specific to the AII digestive disorders with violation of water-electrolyte metabolism, the emergence enteral syndrome (diarrhea, bloating, rumbling) often the dysfunction of the colon, violation of the synthesis and absorption of essential vitamins, metabolic disorders and the development of AII prolonged duration. However, many aspects of pathogenesis and treatment of bacterial diarrhea today is not investigated.

During the treatment of patients with AIII it is extremely important to protect the intestinal mucosa, and effective recovery of the normal intestinal biocenosis with the use of probiotics, which directly or indirectly affect the metabolic activity of relevant organs and tissues.

Currently the "gold standard" in the treatment and prevention of disorders of microbiocenosis, the use of bacterial medicine which regulates normal intestinal flora – probiotics are considered the best. In the correction of dysbiotic changes drugs on the basis of bifida and lactic bacteria obtained wide application. One of these drugs is "Probiz". It consists of Saccharomyces and complex of bifidobacteria and lactobacilli. Each 500 mg of hard gelatin capsule contains: Lactobacillus acidophilus 2 x109 CFU, Lactobacillus rhamnosus 1,5 x109 CFU, Lactobacillus plantarum 1,5 x109 CFU, Lactobacillus reuteri 1 x109 CFU, Lactobacillus casei 1 x109 CFU, Bifidobacterium bifidum 1 x109 CFU, Saccharomyces boulardii 2 x109 CFU, in all 10 x109 CFU live probiotic organisms. Today, the influence of Probiz components on the state of the microflora of the colon and clinical dynamics

of enteric infections has not been studied enough.

Objective: to study the effect of complex treatment including Probizon the state of the intestinal microbiota and clinic of acute intestinal diseases.

Materials and methods. Under the supervision in infectious hospital MMI "Regional clinical hospital" Chernivtsi (Ukraine) there were 21 patients aged 18 to 54 years old (food poisoning was diagnosed in 7 people, salmonellosis – 9, gastroenterocolitis– in 5 patients). All patients were admitted to hospital primarily on the 2nd day of illness with an average degree of severity of the desease; there were 8 men and 13 women. the diagnosis was made on the basis of clinical and epidemiological data and with the help of coproculture verified the causative agent of aII. Material for the study of species composition and populational level of microflora of cavity of the colon in the patients with acute intestinal infection were stool, which were taken from the median portions of faeces put in sterile bottles and transported to the microbiological laboratory of the regional clinical hospital, where a comprehensive microbiological study was carried out. The term since collection of material until the beginning of study did not exceed 2 hours.

All patients fulfilled clinical examination with the dynamics of a detailed study of the epidemiological history. It was found that the common factors of infection were meat, dairy products, confectionery; these epidemiological factors of transmission coincide with the data of other scientists. The clinical tests, capriform, bacteriological examination of faeces, gastric lavage, vomitus were taken into account.

Results and discussion. 7 patients with food poisoning caused by opportunistic flora (Tsytrobakter, Proteus, pathogenic Staphylococcus) were examined. The condition of all the patients was moderate, gastroenteritis version (acute onset of disease, short incubation period, short-term fever to subfebrile digits, nausea, vomiting, epigastric pain mainly in and around the navel, liquid stool without pathological impurities to 5-7 times a day). Clear dependence of clinical variant of the disease from the etiological factor (bacteriologically confirmed) was not found. Observation of intestinal microbiota (4 patients) included the presence of pathogenic organisms, the total number of E. coli E. coli with reduced enzyme activity, opportunistic enterobacteria, staphylococci, fungi genus Candida, lactobacilli, bifidobacteria, hemolytic cocci. Changes in microbiocenosis of the colon was detected in all surveyed: the decrease in the number of lactobacilli, bifidobacteria, total number the E. coli. The content of lactobacilli < 106 CFU /g of faeces was observed in 2 people, and B2 individuals was approaching to normal 107 CFU /g (normal > 106 CFU/g) of bifidobacteria was < 107 CFU/g in 1 patient, in remaining patients to the normal range (> 107 CFU / g). It was discovered a reduce of the total number of E. coli < 106 CFU / g in 1 patient. 9 patients with salmonellosis caused by S. enteritidis were3 examined. The condition of all the patients was moderate, 6 patients had gastroenteritis version, 3 – gastroenterocolitis. In all examined onset of disease was with symptoms of intoxication (fever, raising the temperature to febrile digits, headache, malaise), dyspeptic symptoms (nausea, recurrent vomiting, epigastric pain and preferably in the periumbilical area, frequent liquid stool to 8-10 times a day, which is greenish in color with an unpleasant odor, and in 3 patients with admixtures of mucus). Signs of dehydration I-II (6% weight loss) were observed in all patients.

Observation of intestinal microbiota (4 persons) included the presence of pathogenic organisms, the total number of E. coli E. coli with reduced enzyme activity, opportunistic enterobacteria, staphylococci, fungi genus Candida, lactobacilli, bifidobacteria, hemolytic cocci. Changes in colon microbiota, reduce the number of lactobacilli, bifidobacteria, the total number of E. coli was detected in all patients. The reduction of lactobacilli <106 CFU / g of feces in 4 surveyed; the number of bifidobacteria was <107 КУО / g 2 was found. Reduce of total number of E. coli below <106 CFU / g to 2 people was discovered.

A clinical and laboratory study of 5 patients with gastroenteritis, gastroenterocolitis was

carried out. All the patients had gastroenteritis syndrome (acute onset, fever, nausea, vomiting, rumbling, abdominal pain predominantly in the periumbilical area, frequent watery stool character. The disease was of moderate severity.

The examination of intestinal microbiota (3 patients) included the presence of pathogenic organisms, the total number of E. coli E. coli with reduced enzyme activity, opportunistic enterobacteria, staphylococci, fungi genus Candida, lactobacilli, bifidobacteria, hemolytic cocci. Changes in colon microbiota was detected in all patients already in the first examination, reducing the number of lactobacilli, bifidobacteria, the total number of E.coli. The reduction of lactobacilli <106 CFU / g of feces in 3 patients, and 2 persons reached 106 CFU/g (normal > 106 CFU/g); the number of bifidobacteria was <107 КУО / g in 2 patients, and one reached in normal (>107CFU/g). Discovered reducing the total number of E. coli below <106 CFU/g was found in 2 people.

All patients received basic therapy, detoxification, rehydration with parenteral ("Trysil" rheosorbilact) and oral ("rehydron") the introduction of salt solutions, "Nifuroxazide" chelators ("Enterosgel"), enzymes (replacement therapy) and 11 patients were additionally administered probiotic "Probiz" 1 capsule 2 times a day for 5 days.

As a result of clinical and laboratory monitoring it was found that patients who received a treatment of "Probiz" improved their general condition and normalization of stool notified before (an average of one day) compared to the control group.

Conclusions. 1. Experience of the inclusion to traditional therapy for patients with food poisoning, salmonella, gastroenterocolitis combined probiotic "Probiz" showed that the application of the scheme accelerates regression of symptoms of intoxication and diarrhea syndrome, which generally leads to a reduction in the duration of the acute period of disease.

2.The results of the examination showed the efficacy and safety of the studied probiotic drug "Probs" in acute intestinal infections, primarily of bacterial origin.

3. Control examination of faeces for Salmonella group by the method of coprocultures after treatment were negative, indicating bacteriological efficacy of probiotic against the pathogens of intestinal diseases.

Prospective for further researches is the study of microbiological representatives of colon microflora in the dynamics of treatment by probiotics combined with various intestinal infectious diseases (viral and bacterial).

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THE EXPANSION OF PRIMARY DEFECT OF LINEA ALBA HERNIA

Abstract. *The structure of the anterior abdominal wall was studied by CT in 54 patients having linea alba hernia. The possibility to increase the hernia defect of the primary linea alba hernia was studied on 15 cadavers of adult. This expanding involves two curved sections of the front and rear plates of recti sheaths in the opposite directions. The proposed way to expend the primary linea alba hernia allows you to create the access from 7 to 11 cm. While carrying out this method of expansion there is provided free setting of hernia sac contents into the abdominal cavity and if necessary, the manipulations in the abdomen, saving the strength of the anterior abdominal wall. After carrying out the expansion of hernia defect of primary linea alba hernia, there must be taken the alloplastyc close of the hernia defect.*
Key words: *linea alba hernia, hernia defect, mesh.*

Introduction. The hernia defects plastic is the most frequent operation in the world surgery throughout the twentieth century [2]. Being considered as a rather solved problem, the primary linea alba hernia obviously attracts less attention of the surgeons [4]. But the surgeons often face some technical difficulties during the operations which have not been considered in the modern literature. One of the main points is the inability to repose the fixed linea alba hernia contents because of the relatively small diameter of hernia defect. It makes the surgeon expand the hernia defect. The most frequent operation is performed by means of cranially or caudally along the linea alba which leads to the further weakening of the abdominal wall. In other cases, the increase is carried out aside of hernia defect within the linea alba till the both recti medial edges. However, the received size of wound which is limited by the width of linea alba is not always sufficient enough to repose the hernia contents. As a rule, it leads to the omentum resection or the wound increases vertically along linea alba which respectively enlarges the intraoperative injury, the time of the operation, and weakens the abdominal wall [1].

Objective: to develop the way of hernia defect increase in the experiment and apply it during the surgical treatment of the primary linea alba hernia which can`t be reposed and make it possible to insert the hernia contents of considerable size into the abdominal cavity by means of this method.

Materials and methods. The structure of the anterior abdominal wall was studied by CT in 54 patients having linea alba hernia in order to determine the anatomical and physioilogical characteristics of the abdominal wall. The width of the linea alba, the hernia defect and recti were measured. The examined groups included the patients having the width linea alba of 1 cm, 1,1-2 cm, 2,1-3 cm, 3,1-4 cm or more 5 cm.

There is performed the section from xiphoid processus to the pubis on the abdominal wall of the male`s or females cadaveris. The skin, subcutaneous fatty tissue was ripped reaching the linea alba aponeurosis. Then the skin with subcutaneous fat were separated sharply from the front plate of the recti sheaths on the both sides of the linea alba at a distance of 8-10 cm away from it.

The possibility to increase the hernia defect of the primary linea alba hernia was studied on 15 cadavers of adult. This expanding involves two curved sections of the front and rear plates

of recti sheaths in the opposite directions (fig. 1 a, b). After researching in the experiment, this way of the hernia defect expanding is introduced for the clinical use.

In order to determine its suitability, there was conducted the analysis of surgical treatment involving 296 patients having primary linea alba hernia. Because of difficulties to set the hernia sac contents into the abdominal cavity and the necessity to perform the simultaneous operation immediately on the abdomen organs, 22 patients were operated by means of the developed way to expand the linea alba hernia defect.

Results and discussion. There were more women (39) than the men (15) among the patients of all age groups. The minimum diameter of the hernia defect in patients screenea with CT was 0,8 cm, the maximum – 4,6 cm. According to the classification of the EHS [3], patients with small sizes of umbilical hernia were (32 or 59,26%) dominated. The hernia defects were of average (in the range from 2 to 4 cm) in 20 (37,04%) patients. Only 2 patients with linea alba hernia had large hernia defects, that was higher than 4 cm. The sizes of hernia sac exceeded the sizes of the hernia defect in 6 surveyed patients.

During the study, there was found that the average width of linea alba at the umbilical level (3,59±1,28 cm) was significantly higher ($p<0,05$) than the average width of the linea alba above (2,79±1,23 cm) and below umbilical (1,95±1,54 cm).

The distribution of the patients by gender and the width of linea alba showed that there was not anyone having the width of linea alba lower than 1 cm at the umbilical level among the patients with umbilical hernia. Only smaller number of the patients (4 or 7,41%) had a width of linea alba of 1,1-2 cm at this level. Most of the patients had a width of linea alba above 2 cm (92,59%). The women were dominated among the patients. The maximum width of linea alba measured by CT was 5,6 cm.

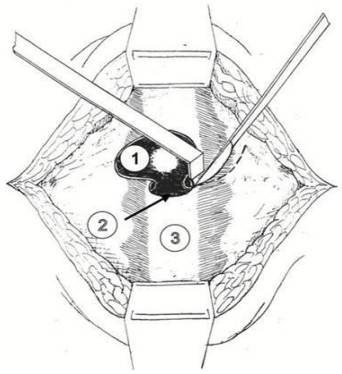
During the analysis concerning the dependence of the linea alba width and recti, these was found out that there was not any significant difference in patients having different width of linea alba.

The study of the width of recti while using CT scans revealed that they have approximately of the same width on both sides. The minimum width of recti accounted for 2,1-2,3 cm. The maximum – 9,98 cm, 10,09 cm on the left and right. The average width of recti at the umbilical level was accounted to 6,66±1,58 cm.

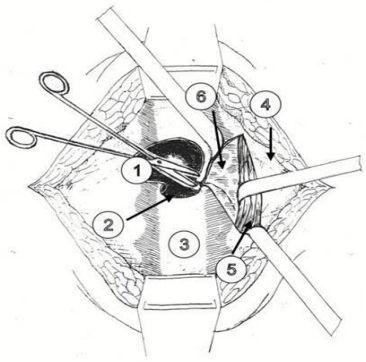
While conducting the experimental studies on cadavers of adults, we investigated the possibility of lateral expansion of the hernia defect.

Among the cadavers of men and women there was dominated the width of linea alba of type I (by Lavrova), with a maximum increase in the umbilical level. Mostly we observed the width of the linea alba at the umbilical level of 2,1-3 cm (63,4%). The width of recti at the umbilical level was almost the same on both sides 6,48±0,87 cm.

The possible expansion of the hernia defect was modeled on the front abdominal wall of cadavers (figure. 1 a, b).



A



B

Figure. Expansion of primary defect of linea alba. 1 – hernia sac; 2 – hernia defect; 3 – linea alba; 4 – front plte of recti sheaths; 5 – recti; 6 – rear plate of recti sheaths.

The aponeurosis of linea alba was transversed cutting from the left side of the umbilical ring to the left edge of the medial of recti. Next, the section in the form of an arc centered on the midline and cranial direction goes on the front plate of the recti sheath. The edges of the front plate of the recti expanded aside the medial edge of the recti by the Farabef hook were divered the laterally, thus these was formeed the access to the back plate of the recti sheath. The back plate of the recti sheath was cut in the form of an arc centered on the midline and caudal direction. Spreading out the edges of the back plate of recti sheath and peritoneum, we get the laparotom wound of the suitable size to repose the hernia contents into the abdominal cavity.

The extension was performed on the one side and on both sides. In this case the hernio-laparotom wounds were increased in size. It was established that recti can be taken in the side with Farabef hook approximately for 2/3 of its width. So, in the course of the experiment, there was found out that if the hernia defect of umbilical hernia is smaller than the width of the linea alba, it can be expanded to fit linea alba and for 2/3 of the width of the recti on the side or on both sides.

So, on average, the patients who were examined by CT, the hernia defet of umbilical hernia may be expanded to fit the linea alba (from 2 cm to 5,6 cm) and another 5-6 cm (at unilateral expansion), or about 10-12 cm (bilateral increase). So, generally it is possible to get hernio-laparotom wound in the patients having hernia defect of small size (for classification of EHS to 2 cm) but large-sizes hernia sac of about 12 to 17 cm. In this case, the strength of the necessary manipulations: reduction of hernia contents, possible resection of necrotic area of the intestine, omentum strands or perform simultaneous operations.

Analyzing the surgical treatment of 208 patients with umbilical hernia, in the vast majority of them (61,77%), the hernia protrusion was reposed into the abdominal cavity. But in the fourth part of patients (25,48%) the hernia was not reposed before operations. The rest – 33 (12,75%) the hernia was inserted partly. In the most case (18 patients) the hernia sac sizes were much higher than the diameter of the hernia defect.

During the operation of the fixed umbilical hernia we resorder to expand the hernia defect along the linea alba in 6 cases. The following plastic hernia defect in these patients is made by the Sapezhko method (2) and alloplastyc of preperytoneal mesh implant (4). In cases of hernia defect alloplastyc such expansion led to the increased grid size of implant, since it has to replace, 3-4 cm wound edges.

In 22 cases besides the described in the literature methods to expand umbilical ring within the linea alba (in the transverse and longitudinal directions), there was performed the developed way to expand the hernia defect according to the methods of experimental study.

Among these patients, the vast majority (17) there was made unilateral (right left-hand) extension. In 5 cases there was performed bilateral increase of hernia defect.

The wound after expansion was being closed in the reverse order. First, we closed peritoneum by vicryl (monocryl) ligature – after its previous detachment in size. Then there was seven back plate of recti sheath to the hernia defect taking the hook away. The recti set aside before, was put on the proper place. The mesh was placed and fixed in the preperitoneal space in 16 patients. Then the wound of front plate of recti sheath was seved up by polydakson or polypropilen ligature. Because of the mechanical damage of the peritoneum during the operation in 6 patients and rear leaf of recti sheath, there was mobilized the retromuscular space which the mesh was established. The further surgery didn`t differ from that described.

Among the patients who experienced the expansion of hernia defect of primary linea alba hernia, the postoperative complications were not observed. The patients were being examing in terms of 0,5 to 3 years. The recurrence of hernia was found out in 2 patients who were completed the expantion of the hernia defect along the linea alba followed the grafting by the Sapezhko technique. Among the patients who were completed the expansion by the

developed method of hernia defect, the recurrence of hernia is not detected.

Conclusions. 1. The proposed way to expend the primary linea alba hernia allows you to create the access from 7 to 11 cm. 2. While carrying out this method of expansion there is provided free setting of hernia sac contents into the abdominal cavity and if necessary, the manipulations in the abdomen, saving the strength of the anterior abdominal wall. 3. After carrying out the expansion of hernia defect of primary linea alba hernia, there must be taken the alloplastyc close of the hernia defect.

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REGRESSICE MODEL FOR DETERMINING A RELATIVE NUMBER OF THYMOCYTES IN THE THYMIC CORTEX OF IMMATURE RATS BASED ON THE SERUM TRANSFORMING GROWTH FACTOR-β1

Abstract. *When the serum transforming growth factor-β1 (TGF-β1) rate increases, which is typical for liver damage, there is a suppression of the immune system and the quantitative morphometric changes in the thymus are morphological reflection of these abnormalities. This correlation between the serum growth factor and a relative number of thymocytes in the thymic cortex of immature rats is embodied in polynomial regression and allows an indirect and non-invasive method to determine the morphological indices of the thymus.*
Key words*: immature rats, thymus, transforming growth–β1 factor, polynomial regression.*

Introduction. TGF–β1, transforming growth factor beta is a multifunctional cytokine involved in the regulation of proliferation, apoptosis and metabolic reactions in various target cells, it is a cytokine with systemic effect as the expression of its high-affinity receptor is widespread, the factor suppresses hematopoiesis and synthesis of pro-inflammatory cytokines, it also stimulates neoangiogenesis (J.A. Mengshol, L . Golden-Mason et al, 2010; J.P. Edwards, H. Fujii, 2013). The role of TGF-β1 in the pathology of the liver is known - it is a profibrinogen factor that accelerates the pace of fibrosing through the activation of stellate cells, increased production of extracellular matrix proteins and collagen type I, besides TGF-β1 is predictive of accidental thymic involution (M.Y. Kapitonov, 2006; A.A. Yarylin, 2003; J. P. Alekseeva, T.M. Bryzhina et al., 1991).

The issue of the role of TGF-β1 in the development of secondary immunodeficiency is not clarified in an experiment adequately, the involvement of TGF-β1 in the accidental involution of the thymus and the impact on cellular and humoral immunity has been proved (O.Y. Huminska, 2014; R.T. Robinson, J.D. Gorham 2007). However, quantitative characteristics of this relationship need further studying.

Objective: to establish a quantitative relationship based on the qualitative relationship between the serum transforming growth factor-β1 and a relative number of thymocytes of the thymic cortex of immature rats.

Materials and methods. The research involved 20 white nonlinear immature female rats aged 60 days. The animals were kept in vivarium conditions of M.I. Pyrohov VNMU with free access to water and food. All experiments were conducted in compliance with the "General ethical principles in experiments with animals" (Kyiv, 2001) and were consistent with the provisions of the "European Convention for the protection of vertebrate animals used for experimental and other scientific purposes." Sampling was performed under general thiopental anesthesia by cervical dislocation, fixation of morphological material was carried out by the conventional method. The study of histological structure of the thymic tissue was performed on the left lobe, the resulting material was fixed in 10% neutral formalin. After a standard procedure, it was embedded in paraffin, histological sections 5 microns thick were made in microtome HM-360 company "Zeiss". The sections were stained with hematoxylin-eosin. Obtained specimens were examined with a microscope Olympus BX 41 at different magnifications and photographed.

In addition to a qualitative descriptive assessment of histological structure of laboratory animals thymus, we also determined the following indices using Weibull's net [G.G. Avtandilov, 1990]: the relative area of the cortex and medulla, ratio of relative areas of cortex and medulla, the relative amount of thymocytes and epitelioretykulotsytiv cortex, the relative number of thymocytes and epithelioreticulocytes of the cortex, the relative number of thymocytes and epithelioreticulocytes of the medulla for morphological verification of the presence and assess of the extent of accidental thymus involution.

The serum transforming growth factor-β1 rate was determined by ELISA on a stripped immunosorbent analyzer StatFax 303+ (Awareness Technology), using reagents of a firm «DRG» (Germany).

Results and discussion. We have proved a clear link between qualitative characteristics of a relative number of thymocytes of the cortex and those of the serum transforming growth factor-β1, these characteristics can be transformed into quantitative ones by using regression analysis.

While studying the transforming growth factor in the serum of rats, we found that the content of TGF-β1 is - 251,04 ± 4,820 pg / L, the relative number of thymocytes in the thymic cortex of immature rats is 51,20 ± 0,49.

In this case, the relationship between the number of thymocytes and the TGF-β1 rate as well as values of the population of lymphocytes in the peripheral blood in intact rats can be transformed into quantitative ones using regression analysis. In the simulation by means of step-by-step direct regression analysis of quantitative relationship between correlations, the regression model included the number of thymocytes of the cortex and TGF-β1 index with quite high levels of predictivity. Evaluation of prognostic contribution of an independent variable (TGF-β1) in a step by step procedure was determined by R^2, that is 0.9807 in this formula, i.e. in 98.07% a chance of matching the actual value (the number of thymocytes in the cortex of the thymus) calculated (for this model) at p <0.001.

Table 1

Indices of regression model of the dependence of number of thymocytes in the thymic cortex on the index of transforming growth factor-β1 in the serum of intact rats

Results of regression for the dependent variable: number of thymocytes R=0, 99; RI=0, 98; adjusted RI=0, 9807; F(2,17)= 48,15;p<0,0001; Standard error: 0,25				
variable	B	Standard error. B	t (34)	p-level
absolute term	31,29	0,64	48,71	0,000
TGF–β1 (i)	0,079	0,002	31,11	0,000

The coefficient of determination R2, as a measure of the quality of forecasting approximates the estimated dependent variable for 98.07%. The standard error of the estimation in this case is 2.368, that in terms of the maximum and minimum value could reach approximately from 4.47% to 4.8% (i.e. theoretically, the maximum deviation can be up to 5%).

In carrying out serial analysis of residues of the dependent variable, none of the observations extends beyond two sigmas, besides, the average of the difference of the actual and calculated theoretically is "0". With this number of observations F critical is 2.17, in fact, in this formula it is 48.15, which is much more than the critical value. On this basis, we can state that the regression linear polynomial is significant at p <0.001.

The graph of residue distribution (differences of theoretical and actual normal number of thymocytes in the cortex of the thymus) clearly shows their location on the line without deviation beyond the 95% confidence interval (Fig. 1). In the final version of this formula is as follows:

$$N = 31,29+(0,079\times TGF\ \beta\text{-}1)\pm 0,25\ (\text{або}\pm 5\%);$$

Where: N – a relative number of thymocytes in the thymic cortex of immature rats; 31.29 is a free coefficient;

RI=0,9807 (an adjusted connected R) determines the predictivity of the model at 98,07 % at p<0,001; the value TGF–β1 for this

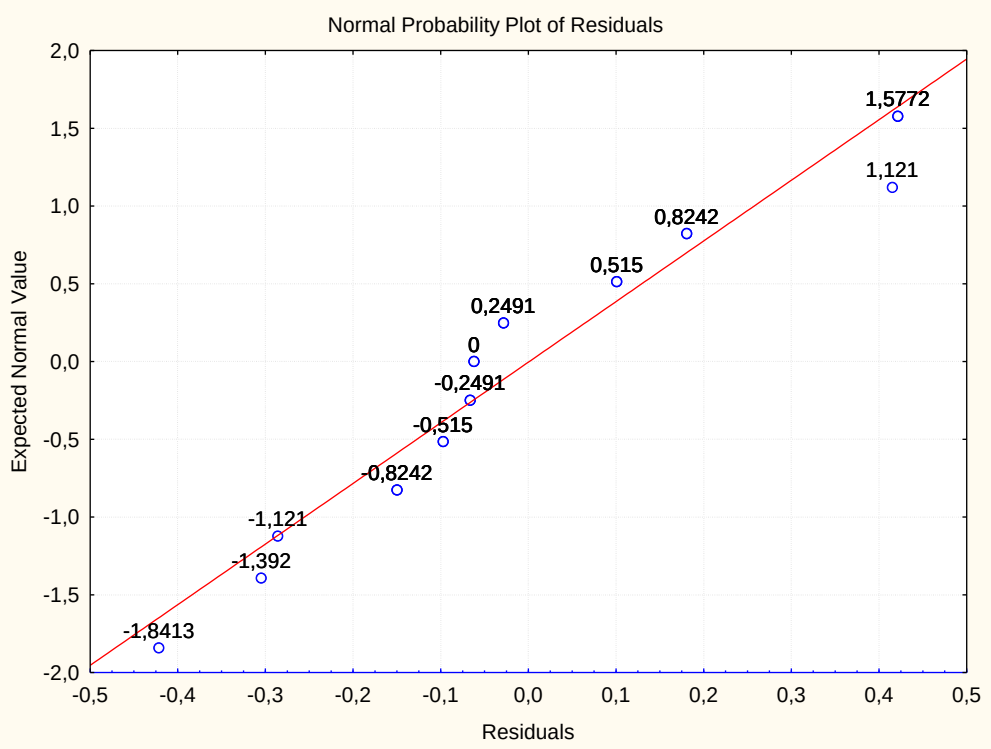

Fig. 1. Value of deviations in a modeled number of thymocytes in the cortex of the thymus in immature rats.

group of immature rats is 251,04± 4,820 pg/l; ±0,25 is a value of the standard deviation relatively the average value.

Conclusions. The above leads to the following conclusion that the number of thymocytes of thymic cortex is in a qualitative and quantitative dependence on the TGF-β1rate, which with high probability allows theoretically predict the number of thymocytes depending on the normal rate of the latter, polynomial is patented to the useful model number 100926.

Prospects of further research. The quality of the polynomial (formula) is high, which indicates its prospects of use to determine the relative number of thymocytes in the thymic cortex in terms of transforming growth factor-β1 in the serum of immature rats as a method of indirect determination of morphological index with 95% probability this polynomial can be used in research activities.

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