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• ABSTRACTS

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Oral presentations

Section 1
Problematic aspects in medicine associated with vitamin D deficiency

Vitamin D supplementation and hypocalcemia in newborns and premature infants

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Background. Vitamin D receptors (VDR) are found in all cells of the immune system. Newborn children, including premature babies, belong to the risk group for the occurrence of vitamin D deficiency. Calcidiol participates in the adequate operation of the mother-placenta-fetus system, including a beneficial effect on the development of the embryo and the course of the intranatal and neonatal periods.

Aim. Analysis of the relationship between the concentration of vitamin D in blood serum and total calcium in newborns.

Methods. Laboratory examination of 498 children was carried out. 304 (61.1%) babies were born full-term, 135 (27.1%) prematurely, and the control group included 59 (11.8%) children.

Results. The median concentration of calcidiol in the blood serum of full-term infants was 14.2 [7.8; 21.8] ng/mL; in premature infants it was 13.4 [6.6; 21.6] ng/mL; and in the control group, it was 16.2 [8.9; 24.0] ng/mL. Among full-term children, 108 (35.5%) had a severe deficit of 25(HE)D (less than 10 ng/mL), 98 (32.2%) had deficiency (10–20 ng/mL), 69 (22.7%) had insufficiency (20–30 ng/mL), and 29 (9.6%) had the optimal concentration of calcidiol (more than 30 ng/mL) in blood serum.

Newborn children with extremely low body weight, ultra low body weight and low body weight had vitamin D deficiency: 15.6 [10.8; 19.1] ng/mL, 19.0 [12.3; 24.1] ng/mL and 19.4 [13.2; 23.5] ng/mL, respectively. Infants with extremely low body weight had a statistically significantly lower concentration of 25(OH)D in blood serum in comparison with children with ultra low body weight and low body weight ($P = 0.001$) and ($P = 0.001$).

A positive relationship was obtained between the weight of children with ultra low body weight and the concentration of vitamin D ($r = 0.28$, $P = 0.046$). Of all premature infants, 17 (12.6%) had severe vitamin D deficiency, 62 (45.9%) had deficiency, 34 (25.2%) children had insufficiency, and 22 (16.3%) babies had optimal concentration of 25 (OH)D. Premature newborns with severe vitamin D deficiency had hypocalcemia in 100% of cases, those with vitamin D deficiency had hypocalcemia in 82.6%, and those with insufficiency had it in 78.2%, which is statistically significantly more frequent than in children with optimal supplementation (30% of newborns) ($P = 0.001$), ($P = 0.001$) and ($P = 0.01$), respectively.

A positive relationship ($r = 0.609$, $P = 0.001$) was revealed between the concentration of 25(OH)D in blood serum and the total calcium index.

Conclusion. In more than half of the cases, full-term and premature infants had vitamin D deficiency (less than 20 ng/mL) during the first three days of life. Vitamin D levels in children with extremely low body weight were statistically significantly lower than in children with ultra low body weight and low body weight ($P = 0.001$) and ($P = 0.001$). Against the background of severe vitamin D deficiency, hypocalcemia was verified in 100% of cases in premature newborns on the first day of life, while a positive relationship was revealed between 25 (OH)D and the indicator of total calcium in blood serum ($r = 0.609$, $P = 0.001$).

Thymus indices in newborn rats in conditions of mountain hypoxia of Kyrgyzstan

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Introduction. The problem of adaptation of the body to extreme influences, including oxygen starvation, will always be in the focus of attention of researchers of various profiles, since oxygen deficiency in one form or another accompanies a person throughout the entire life cycle (1, 2, 3).

The physiology of an integral organism studies not only the internal mechanisms of self-regulation of physiological processes, but also the mechanisms that ensure continuous interaction and inseparable unity of the organism with the environment. An indispensable condition and manifestation of such unity is the adaptation of the organism to these conditions. However, the concept of adaptation has a broader meaning and significance.

Aim. To study the morphofunctional structure of the thymus gland in newborn rats.

Methods. 1. Anatomical methods (preparation). Under the MBS-2 binocular magnifier, the thymus was isolated and purified from surrounding tissues. The thymus was fixed in a 10% neutral formalin solution on a phosphate buffer for 24 hours. 2. Histological methods (hematoxylin-eosin staining, according to Van Gieson).

Results. The histology of the thymus was studied in 60 newborn rats living in various ecological and climatic conditions of Kyrgyzstan. In low-altitude conditions (770 m above sea level), all indicators of the control group are within normal limits. The indicators obtained at the Tuya-Ashu pass in high-altitude conditions (3200 m above sea level) are characterized by a noticeable change in the number of cells, in particular, an increase in lymphoblast indicators. In the conditions of the Cholpon-Ata midlands (1660 m above sea level), the number of thymus cells decreased. In the conditions of the highlands of Naryn (2000 m above sea level), the number of cell populations per unit of the conditional area of the cortical substance of the thymus lobule was lower compared with the animals of the middle mountains of Cholpon-Ata.

Conclusion. Thus, in low-altitude conditions of Bishkek, i.e. 770 m above sea level, all indicators of the control group are within the species norm. In high mountain conditions (3200 m above sea level), there was a noticeable change in cells, for example, the number of indicators increased by 0.36%, average lymphocytes increased by 0.14%, average lymphocytes by 0.12%, small lymphocytes by 0.1%, apoptotic bodies by 0.5%, mitoses by 0.15%, Ghassal corpuscles by 0.37%, and the macrophage index by 0.16%. According to the stereometric characteristic, the cortical substance of the thymus of newborn rats was 0.9% larger. The medulla increased by 7.7%. Inter-lobular septa increased by 19.4%.

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Prospects for the use of TriDal® spray in patients with osteoporosis and sarcopenia

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Background. In the context of global aging of the population, the problem of combating osteoporosis (OP) and sarcopenia (SP) is associated with an increased likelihood of falls, fractures, disability and death. OP and SP are interconnected by a systemic inflammatory reaction, mutual influence on bone metabolism, muscle mass and functional activity, developed due to vitamin D deficiency.

Aim. To evaluate the effect of vitamin D sublingual spray (TriDal® spray) in a combination of OP and SP.

Methods. 30 patients (66.7% women) from 65 to 85 years old (mean age 72 ± 3.5 years) with OP underwent assessment of the level of 25 (OH) D_3 in the blood, the risk of FRAX fractures, the symptoms of SP by SARC-F scale, IPAQ questionnaire, SPPB test, and hand dynamometry, taking into account criteria EWGSOP2 (1) at the beginning of the study and after 3 months of daily sublingual instillations of 3 doses of TriDal® spray (cholecalciferol 1200 IU / day).

Results. After 3 months of using TriDal® spray, a significant increase in the level of 25 (OH) D_3 in the blood (by 40%), a decreased pain and SP manifestations on the SARC-F scale (on average, by 2.4 points) according to the IPAQ questionnaire (by 3.2 points), SPPB test (by 4.6 points), increased force of compression of the hands (on average, by 3.6 kg), and no falls and fractures were noted.

Conclusions. TriDal® spray is effective in patients with OP and SP over 65 years of age for 3 months of use in a daily dose of 1200 IU (3 instillations into the oral cavity), optimizes the level of 25 (OH) D_3 in the blood, reduces the manifestations of SP, the risk of falls and fractures, increases muscle strength, physical activity, is well tolerated, and has established itself as a safe, high-quality product.

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Changes in mineralization of bone tissue in patients with pneumonia caused by SARS-COV-2

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Background. One of the most pressing problem of our time in the context of the COVID-19 pandemic is the problem of accurate timely diagnosis of damage to various organs and systems caused by atypical viral pneumonia. If radiological semiotics of damaged respiratory organs has been sufficiently studied, then the lesions of other structures, such as the cardiovascular system, the central and peripheral nervous system, and the musculoskeletal system, have not been sufficiently studied, which requires separate clarification. Among the least illuminated in this direction are the lesions of the musculoskeletal system.

Aim. A retrospective analysis of the bone density thoracic vertebrae in patients with SARS-Cov-2-caused pneumonia, who underwent CT-examination of the chest organs. In total, 35 patients aged 45 to 75 years old, who underwent examination in the period from 2021 to 2021, were taken into account. There were 22.8% of men and 77.2% of women. The average age of women was 63.3 years, and that of men was 61.3 years.

Methods. All patients were observed in dynamics, with a repetition rate of studies after 5–7 days, as well as after 3 and 6 months from the moment of illness. On the images obtained, the volume of lung lesions was assessed by identifying areas of compaction of the "ground glass" type, usually peripheral and peribronchial location with or without consolidation. The average value of lung damage, according to computed tomography, was 42.05 ± 17.2%. The average value of lung tissue damage was 44.16 ± 15.7% in men and 41.62 ± 17.7% in women. The severity of the condition was assessed by the total volume of lung tissue damage according to a semi-quantitative method (1). Accordingly, the severity and degree of lung damage was determined by the degree of changes in the radiodensity in the Th5, Th6, Th7 vertebrae and the change in the number of bone elements of the trabecular tissue per unit area (1 cm^2).

Results. As a result of the analysis, an inverse correlation was found between the average radiodensity of Th5, Th6, Th7 vertebrae in Hounsfield units and the value of lung tissue damage in percent. The Pearson correlation coefficient was $r = -0.1$. In addition, in some patients, a visual decrease in the number of bone trabeculae and an increase in their dissociation were observed.

Conclusions. Thus, we can conclude that the manifestations of pneumonia caused by SARS-CoV-2 are accompanied by changes in bone metabolism, leading to a decrease in bone density, which in turn increases the risk of pathological fractures, decreases the quality of life of patients and requires additional medical correction of existing disorders.

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1. Interim guidelines for the prevention, diagnosis and treatment of new coronavirus infection (Covid-19) of the Ministry of Health of the Russian Federation.

Implementation of the national program "Vitamin D deficiency in children and adolescents of the Russian Federation: modern approaches to correction": results in the south of Russia

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Background. The question of optimal preventive and therapeutic dosage of vitamin D currently remains the most discussed one in the medical community.

Aim. Analysis of the structure of availability and median of 25(OH)D before (2013–2016) and against the background (2018–2019) of the introduction into clinical practice of the National Program "Vitamin D deficiency in children and adolescents in the Russian Federation: modern approaches to correction" in young children living in the south of Russia (NP).

Methods. The study consisted of two stages. The first one took place between 2013 and 2016, i.e., before the introduction of NP, and the second one in 2018–2019, i.e., against the background of the introduction of NP into clinical practice. The objects of the study were 246 children during the first three years of their lives (excluding the first month), who were prescribed preparations containing cholecalciferol drugs. The age of children at the first stage was 11.7 ± 0.7 months, and at the second, it was 13.9 ± 1.0 months ($P > 0.05$). By age, children at the first and second stages were distributed as follows: from 1 to 6 months – 52 (31.7%) and 14 (17.1%), from 6 to 12 months – 47 (28.7%) and 32 (39.0%), children of the second year of life – 42 (25.6%) and 22 (26.8%), children of the third year – 23 (14.0%) and 14 (17.1%), respectively. Satisfactory vitamin D availability was diagnosed at the level of 25 (OH)D more than 30 ng/mL, insufficiency from 20 to 30 ng/mL, and deficiency at less than 20 ng/mL.

Results. Against the background of the introduction of NP into clinical practice, the frequency of prescribing a dosage of 500 IU/day decreased to 4.9% ($P < 0.001$), that of 1000 IU/day increased to 70.7% ($P < 0.001$), and the dose of 1500 IU/day was taken by 24.4% of children. After the introduction of NP into clinical practice, the frequency of prescribing a dosage of 500 IU/day decreased to 5% ($22 = 80.4$; $P < 0.001$), that of 1000 IU/day increased to 71% ($\chi2 = 53.5$; $P < 0.001$), and the dose of 1500 IU / day was taken by 24% of children, mainly in the second and third years of life. In children examined in 2013–2016, the median serum calcidiol was 29.1 [22.8; 39.5] ng/mL, and in 2018–2019, it was 51.3 [38.1; 61.5] ng/mL ($P < 0.001$). Hypovitaminosis D was diagnosed in 54.9% of young children in the south of Russia until 2018. Against the background of the introduction of NP, it was diagnosed only in 12.2% of children ($\chi2 = 24.3$; $P < 0.001$). The number of children with calcidiol levels over 30 ng/mL, on the contrary, increased from 45.1% to 87.8% ($\chi2 = 39.9$; $P < 0.001$). The number of children with insufficiency decreased to only 10 (12.2%) cases, while their number used to be 62 (37.8%) ($\chi2 = 17.3$; $P < 0.001$). Among the children examined in 2018–2019, severe deficiency (calcidiol level less than 10 ng/mL) and vitamin D deficiency (10–20 ng/mL) were completely eliminated, while previously they were registered in 6 (3.7%) ($22 = 220.8$; $P < 0.001$) and 22 (13.4%) children ($\chi2 = 167.9$; $P < 0.001$). In 2013–2016, the indicator of the recommended average daily dosage of vitamin D was 73.3 [51.6; 103.1] IU/kg per day, while in 2018–2019 against the background of the implementation of the recommendations set out in NP, it was 125.0 [102.0; 148.7] IU/kg per day ($P < 0.0001$).

Conclusion. In comparison with the period before the implementation of the National Program, the level of the recommended average daily dose increased statistically significantly. It was demonstrated that daily doses per kilogram of body weight in the range from 100 to 150 IU/kg, included in the main provisions of the recommendations for the preventive intake of vitamin D preparations at an early age, were confirmed.

Pathogenetic aspects of changes in the adenohypophysis under the combined effect of infection and hypoxia

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Background. The pituitary gland, as the highest vegetative center of the body, plays a leading role in the functional activity of the neuroendocrine system as a whole, as well as in maintaining the body's homeostasis in various stressful situations. In this regard, the study of the morphofunctional state of the gland in various pathologies in modern medicine is one of the urgent problems.

Aim. To study the pathogenetic aspects of the morphofunctional features of structural changes in the adenohypophysis under the combined effects of infection and hypoxia.

Methods. Male rats weighing 180–200 g were used in the experiment. The model of peritonitis was created by injecting 1 mL of S. aureus culture dissolved in a concentration of $1x10^9$ microbial cells per 1 kg into the peritoneal cavity of animals and placed in a pressure chamber at an altitude of 2500–3000 m above the sea level. Materials taken from the adenohypophysis of experimental animals at different times of the study were studied by anatomical, histological, electron microscopic, immunohistochemical and morphometric methods.

Results. Under the influence of staphylococcal infection and hypobaric hypoxia, the pituitary tissue turns out to be "unstructured", and sometimes in the form of fine-grained cell contours in a state of decay and lysis. On the background of leuko-lymphocytic infiltration, hypertrophy or focal atrophy, accompanied by extensive coagulative necrosis or fibrosis of adenocytes, glandular discomplectation is noted, vacuolated basophils predominate. The walls of the capillaries in the area of the intercellular tissue of the gland are indistinct due to necrosis and are often indistinguishable. This is manifested by a number of symptoms, such as the filling of the interstitial space with lymphocyte-like cells and the dilatation of numerous capillaries. Morphometry of cellular elements shows a relative decrease in the number of cell populations (basophils, acidophiles, chromophobes) on the background of a compensatory increase in the volume of basophils. At the end of the study, signs of incomplete regeneration, mainly sclerotic processes and cystic-atrophic changes in the parenchyma, appear.

Conclusion. A comparative analysis of the results of the study shows that hypoxia aggravates the course of peritonitis and leads to deeper structural changes.

Study of neuroplasticity and cognitive functions with long-term optogenetic stimulation

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Background. Modern concept of neurorehabilitation is based on a study of neural plasticity mechanisms. Optogenetics research is a promising direction in studying the molecular mechanisms underlying synaptic plasticity, opening up new opportunities in restoring lost functions and improving the quality of life of patients with neuropsychic diseases (Alzheimer's disease, Parkinson's disease, autism, depression, alcohol dependence, etc.).

Aim. To study the effects of neuroplasticity modulation using long-term optogenetics stimulation of the dorsal hippocampus.

Methods. The study was carried on 40 transgenic mice of the Ai27(RCL-hChR2(H134R/tdT)–D-line, which were divided into 4 groups: group 1 – experimental group (n = 10) including animals subjected to optogenetic stimulation, group 2 – control group (n = 10) including intact animals, and two comparison groups: group 3 consisting of animals with fixation of results 5 months after optogenetic stimulation (n = 10), and group 4 consisting of animals that underwent stereotactic surgery with the installation of fiber optic neurointerface, but without photostimulation (n = 10).

For the neurointerface introduction in the dorsal hippocampus of experimental animals, the modern stereotaxic technologies were used. The blue light stimulation (470 nm) was used in the "on-off" pulse mode with a total duration of 21 minutes per day for 8 weeks. Morphological methods and cognitive tests were used for results fixation. Statistical analysis was performed in the Statistica 10.

Results. Prolonged optogenetic stimulation of the dorsal hippocampus has a positive effect on neuroplasticity and cognitive functions. This is evidenced by the results of the Barnes test: a reduction in the length of the track (by 28%) and the passage time of the maze (by 22%) by animals that were subject to optostimulation compared with the control group.

Light microscopy and morphometry determined a statistically significant ($P < 0.05$) increase in the cell density of the dorsal hippocampus in the experimental and comparison groups relative to intact animals. It should be noted that in the group of operated animals, neuron density indicators were higher than in the control group; however, the highest results were determined in animals subjected to optogenetic stimulation, especially in animals 5 months after optogenetic stimulation (83 cells per 10 000 mm^2).

The evaluation of the results of electron microscopy indicates an increase in the number of myelinated processes and dendritic connections in the experimental groups compared with the control group, at a significant level of data difference ($P < 0.05$).

Conclusions. Prolonged optogenetic stimulation of neurons in the dorsal hippocampus promotes activation of brain plasticity, which is clinically manifested by improved cognitive functions in the form of increased speed and shortening of the track when passing the Barnes test. Morphologically, in the experimental and comparison groups, there was an increase in the density of the dorsal hippocampus, an increase in synapse formation and indicators of neuroglia activity. Analysis of the data obtained during the study of indicators in comparison groups confirms that the therapeutic effects of stimulation not only persist after the end of the glow, but also increase over time. It can be concluded that the development and implementation of optogenetic techniques in practice is a promising area of research in modern fundamental medicine and opens up new opportunities in the therapy and rehabilitation of neurodegenerative pathologies.

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Sarcopenia in elderly and old men with polymorbid pathology

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Background. Sarcopenia is a disease associated with aging and polymorbidity, the frequency of which increases with age. Polymorbidity is a common occurrence in geriatric patients. It is of interest to study the frequency of occurrence of sarcopenia, the degree of its severity in elderly and old men against the background of polymorbid pathology.

Aim. To determine the incidence and severity of sarcopenia in the group of elderly and old men.

Methods. Our one-stage cross-sectional study included 123 male patients aged 65 to 84 years (average age 73.73 ± 5.87 years), of which 65 were elderly (average age 68.72 ± 2.50 years) and 58 were old (average age 79.34 ± 2.44 years). Comparison of the diagnostic parameters of elderly and old men was performed using the EWGSOP2 algorithm.

Results. All men suffered from several chronic non-infectious diseases. In elderly men, the most common diseases were arterial hypertension (84.6%), stable angina pectoris (52.3%), chronic heart failure (46.2%), prostate diseases (40.0%), and osteoarthritis (32.3%). Among old men, there was an increase in the incidence of chronic non-infectious diseases. The Charlson comorbidity index increased from 5.0 [4.0; 7.0] points in the elderly up to 6.0 [5.0; 7.0] points in old men ($P = 0.025$). The handgrip strength was 20.57 ± 7.46 kg in the elderly versus 17.27 ± 6.88 kg in old men ($P = 0.012$). The five times sit-to-stand test and walking speed in elderly and old men did not reveal statistically significant differences, $P > 0.05$. The index of appendicular musculoskeletal mass was 6.69 ± 1.17 kg/m^2 in the elderly group, and 6.21 ± 1.16 kg/m^2 in the group of old men, $P = 0.024$. As a result of determining the indicators of muscle strength, mass and function, the sarcopenia was graded in terms the severity, according to EWGSOP2. The results among elderly men were as follows: probable sarcopenia in 22 men (33.85%); confirmed sarcopenia in 14 men (21.54%); and severe sarcopenia in 14 men (21.54%). Among old men, probable sarcopenia was found in 30 men (51.72%), confirmed sarcopenia in 20 men (34.48%), and severe sarcopenia in 19 men (32.76%).

Conclusions. In old men, compared with elderly men, there is a more severe course of sarcopenia.

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Influence of vitamin D on the course of age macular degeneration

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Background. With the development of medicine and the improvement of living conditions in developed countries, the life expectancy of the population is steadily increasing. The number of elderly people is also growing. A wealth of evidence suggests that age macular degeneration (AMD) is becoming the leading cause of visual impairment in older people in economically developed countries (1). It is known that 30–50 million people on Earth suffer from AMD (2). About 600 thousand new cases of the disease are registered in the world every year (3).

Aim. The study aimed to assess the level of vitamin D in patients with age-related macular degeneration of the retina.

Methods. We examined 94 patients aged 56 to 80 ± 5 years living in the Republic of Kazakhstan. Of these, 43 were men and 51 were women. Vitamin D deficiency was interpreted at a value less than 20 ng/mL (50 nmol/L), hypovitaminosis at a concentration of 20 to 30 ng/mL (from 50 to 75 nmol/L).

Results. Comparative analysis showed the prevalence of vitamin D deficiency in environments and elderly residents. In 89.7% of the subjects, hypovitaminosis D was found. In patients with AMD, the average level of vitamin D was 15.23 ± 3.7 ng/mL (in men 16.07 ± 4.6, in women 14.16 ± 2.8), which corresponds to its deficit. A more detailed analysis of the results of an enzyme immunoassay and a clinical examination of patients revealed a relationship between the state of AMD and the level of vitamin D in the body. In 51% of patients (25% of men and 26% of women) with AMD, the concentration of vitamin D was below 30 ng/mL; in 31% (14.7% of men, 16.3% of women), it was below 20 ng/mL; and in 4% of patients, it was below 10 ng/mL. Vitamin D levels were greater than 30 ng/mL in 14.1% of patients.

A detailed analysis of the results revealed differences by season and by region of residence. According to the results of the study, all patients had a vitamin D deficiency to some degree. In the southern regions during the period of maximum insolation, hypovitaminosis prevailed in 65% of patients, and deficiency in 4%. During the period of minimal insolation, the number of patients with deficiency increased from 4% to 16%. In the northern regions, hypovitaminosis was found in 45%, and deficiency in 33.3%. During the period of minimal insolation, the deficit increased from 33.3% to 41.7%.

Conclusions. Thus, in patients with AMD, hypovitaminosis D was recorded in 89.7% of cases, with 30% being due to vitamin D deficiency. The content of vitamin D in AMD patients from the southern region of the Republic of Kazakhstan exceeds the indices of the northern region.

Intramural lymphatic pools of the epi-, myo- and endocardium

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Background. The study of lymph promotion, as well as the role of individual structural and functional units in this, has led to the theory of the motor function of lymphangions. The role of the lymphangion could be compared with the role of the heart. In pathological processes such as coronary artery disease (ischemic heart disease), the lymphatic system is also affected.

Aim. To study the structure of intra- and extra-organ lymphatic vessels of the heart (1–3).

Methods. To solve the tasks, heart preparations taken from 15 corpses of people of both sexes, who died from accidents and injuries, were studied. The modified Gerot mass was used as a color injection mass. The blue injection mass of Gerot penetrates well into the lymphatic capillaries and lymphatic vessels.

Results. The lymphatic bed of the heart consists of lymphatic capillaries of the endocardium, myocardium and epicardium, lymphatic postcapillaries, intraorgan and extraorgan lymphatic vessels flowing into regional lymph nodes. The main collector receiving lymph from the endocardium and myocardium is the lymphatic bed of the epicardium, consisting of lymphatic capillaries, postcapillaries and vessels. In non-organ lymphangions, the number of myocytes in the muscle cuff is always greater than in the stack of the valvular sinus. Myocytes are in close relationship with collagen and elastic fibers. Connective-woven fibers play an essential role in the motor function of the lymphangion. Elastic fibers of the lymphangion in newborns and adults are thin. In the elderly, the elastic fibers of the lymphangion wall undergo profound changes: they thicken in places, fragment and disintegrate. In elderly people, varicose protrusions often form in the wall of the valvular sinus of the lymphangion. Collagenization and partial atrophy of lymphangion wall myocytes in elderly people obviously reduce the motor function of the lymphangion at this age.

Conclusions. In old age, there are significant changes in the shape, caliber and structure of the wall of the lymphangions of intraorgan and extraorgan vessels of the left lymphatic collector of the heart. In this age group, "cove-like" and "mushroom-like" protrusions of the lymphangions of intraorgan and extraorgan vessels are noted. Protrusions are most often found in the wall of the valvular sinus of the lymphangions of the extraorgan vessel.

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Histopathological changes in the lungs with COVID-19

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Background. On December 31, 2019, a cluster of cases of pneumonia in people who were later linked to Huanan Seafood Market in Wuhan, Hubei, China, were reported. Just a week later, Chinese health authorities confirmed that these cases were caused by a novel coronavirus, later named as SARS-CoV2 (1). Despite the lightning spread of the disease in the world, descriptive results of the clinical and morphological study of the manifestations of this infection have now appeared (2). The statement remains unchanged that the main cause of death in those infected with COVID-19 is acute respiratory distress syndrome (3).

Aim. A study of morphological changes in the lungs of those who died from COVID-19 in Aktobe for the period 05/04/20–15/08/20.

Methods. Autopsy data from 70 patients who died from COVID-19 infection were analyzed, which included the study of the changes reflected in the autopsy protocols, as well as microscopic changes found during histological examination of the lung. The study group was formed by the method of continuous sampling. The criterion for inclusion in the analyzed group was laboratory confirmed cases. Routine haematoxylin and eosin (H&E) staining was used to study all of the tissues.

Results. The most pronounced lung changes in COVID-19 were determined with a predominance of multiple total bilateral lesions of the lower lobes of the lungs, which was manifested by virus-induced changes in the parenchyma and stroma, as well as by microcirculation disorders. As a result of histological examination of the lung, both stages of diffuse alveolar lesion were observed, i.e., acute (early or exudative) and the stage of organization (fibroproliferative, proliferative). The early stage was characterized by damage to alveolocytes, edema of the alveolar septum, accumulation of edematous fluid in the lumen of the alveoli, formation of hyaline membranes. In the fibroproliferative stage, there is a reparation of the lung tissue with hyperplasia of type II pneumocytes, dysplasia of squamous epithelium, and sclerosis of the pulmonary interstitium. At the same time, fragments of hyaline membranes are preserved. Vasculitis of small branches of the pulmonary artery is characteristic of COVID-19. The mechanism of their development is associated with damage to the endothelium of capillaries and small arteries as a result of the direct cytopathic action of the virus.

Conclusions. Lung damage in coronavirus infection (COVID-19) is based on the development of acute respiratory distress syndrome (ARDS), diffuse alveolar damage with an atypical course, causing the development of COVID-19 interstitial pneumonia with synchronous damage to the respiratory tract and the microcirculatory bed.

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Features of sexual development in adolescent girls with primary dysmenorrhea

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Background. The period of puberty is a very responsible and critical period of the child's postnatal development, which often determines their future life. Often, depending on how healthy the child enters this period, it has an effect not only on his future, but also on the future of the next generations.

The sexual development of adolescents is one of the important indicators of the well-being of the population, the study of which in the context of the global trend towards a change in the timing of the onset of adolescence can help identify problems of public health care. Dysmenorrhea occurs in most adolescent girls and is the main cause of occasional short absences from school in this group. A presumptive diagnosis of primary dysmenorrhea can be made based on a typical history of pelvic pain that coincides with the onset of menstruation and lasts 1–3 days. This stage ends with the appearance of menarche in girls. At this time, the level of growth hormone decreases, the level of gonadotropins and estrogens rises, and the function of the thyroid gland is activated.

Aim. To study the characteristics of sexual development according to Tanner and the definition of the Kazakh population among adolescents with primary dysmenorrhea.

Methods. Secondary sex characteristics were assessed by a specialist physician according to Tanner's criteria, which assessed the development of pubic hair, axillary hair development, mammary gland development, and age at menarche.

Results. 105 adolescent girls were examined aged 12 to 18 years. The average age was 15.6 ± 1.7 years. At the time of enrollment in the study, 89% of adolescents had regular periods. Our study revealed that 3.8% of adolescent girls had premature sexual development, and the remaining 96.2% of girls had no pathology in sexual development. The degree of hairiness in the armpit according to Tanner's criteria in the early adolescence according to WHO was 66.3%, and in the late adolescence, it was 33.7%. Pubic hair development in early adolescence was 54.1%, and in late adolescence, it was 45.9%. At the time of inclusion in the study, a higher degree of development was noted by a practitioner in the late adolescence. Taking into account the international regulatory documents that determine the criteria for the onset of puberty, the average age of the onset of menarche was 11–12 years.

Conclusions. The data obtained indicate that, with primary dysmenorrhea, there was no delay in the appearance of secondary sexual characteristics. This research will be continued, as well as the relationship with growth and sexual development among this category of the subjects will be revealed.

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Peculiarities of the vitamin D receptor gene polymorphism in Kazakh children with bronchial asthma

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Background. In recent years, it has been proven that vitamin D is a steroid prehormone that exerts multiple biological effects in the process of its interaction with specific receptors (Vitamin-D-receptor-VDR). There are assumptions that various pathogenetic mechanisms of the effect of vitamin D on the allergic process are mediated by the VDR gene, characterized by polymorphism, i.e., the existence of various allelic variants of the gene in the population. In this context, it seems timely to study the prevalence of VDR gene polymorphism in representatives of various ethnic groups with bronchial asthma (BA), the results of which will allow us to assess the peculiarities of the influence of molecular genetic factors on the course, treatment and outcomes of the disease in accordance with the principles of personalized medicine.

Aim. To determine the TaqI – polymorphism of the vitamin D receptor gene (TT, TS, CC) – in Kazakh children and adolescents with verified BA diagnoses.

Methods. In total, 103 Kazakh children with BA (median age was 12.8 years, fluctuations range was 5–17 years) were examined. The control group consisted of local children without BA: 66 Kazakh children and 40 Russian children. Determination of VDR gene polymorphism was carried out by using PCR technology and DNA sequencing. The studies were carried out in a certified INVITRO laboratory in Moscow city.

Results. In the control group of Kazakhs, TT alleles were found in 38 (57.6%), TS in 23 (34.8%), and CC in 5 (7.6%) children. In the control group of Russians, the TT allele was found in 14 (35%), TS in 22 (55%), and CC in 4 (10%) children. In Kazakh children with BA, TT alleles were found in 71% (68.9%) and TS in 32 (31.1%) patients. The fact of the absence of the CC allele in all (103) children of Kazakh nationality with BA was revealed.

Conclusion. The study of genetic mechanisms directly or indirectly determining the development of BA is the most important direction for individualized prevention and treatment of the disease. This statement fully applies to the study of VDR and BA gene polymorphism. The complete absence of CC allele VDR gene in Kazakh children with BA allows us to assume its protective significance in this population.

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The peculiarity of vitamin D status in children with bronchial asthma

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Background. Bronchial asthma (BA) is the most common chronic disease of the respiratory tract and this pathology in more than 90% of cases causes a broncho-obstructive syndrome in childhood. In recent years, the views on the pathogenesis and treatment of BA have changed significantly. It has been established that, along with the genes responsible for the production of IgE, the supply of the body with some vitamins, in particular vitamin D, is important. The current view is that vitamin D is important not only because of its role in formation of the skeleton and the normal functioning of many organs and systems but also because of its role in the development of atopy and BA. In this context, the need for targeted studies of the vitamin D status in children with different levels of BA severity is evident.

Aim. To assess the peculiarity of vitamin D status in children with BA.

Methods. The study group included 116 children with verified BA diagnoses at the age of 5–18 years, of which 74 (63.8%) were boys and 42 (36.2%) were girls. The control group included 110 apparently healthy children, of which 47 (43%) were boys and 63 (57%) were girls. The determination of the quantity of the active metabolite of vitamin D-25 (OH) D was carried out in the INVITRO laboratories in Moscow by using the technology of chemiluminescent immunoassay on microparticles.

Results. In the study group of children with BA, the normal level (30 ng/mL and more) of the active metabolite of vitamin D was detected only in 6 patients (5.2%). In the rest of the examined patients (110, 94.8%), the values of the 25 (OH) D level corresponded in general to the indicators of deficiency (less than 30 ng/mL), and in more than one-third of the patients, the deficiency of the active metabolite of vitamin D (less than 20 ng/mL) was found. It should be noted that in the study group of BA patients, the level of 25 (OH) D was significantly ($P = 0.008$) lower than similar values obtained in the contingent of healthy children in the control group. The data received after the study indicates reliably high ($P = 0.007$) values of vitamin D in boys compared with girls in the control and study groups.

Conclusion. Reliably low values of the active metabolite of vitamin D in children with BA in comparison with the reference data and the results obtained in the control group confirm the etiopathogenetic significance of vitamin D deficiency in the development, peculiarities of the course and outcomes of BA in children. The obtained results of the study suggest the need to correct vitamin D status by etiopathogenetically justified prescription of vitamin D medicines to children with BA.

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Polymorphism of hypovitaminosis D genes in young children of the kazakh population

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Background. With the development of the skeleton, up to 80% of genetically determined bone mass accumulates in childhood (1). These data give rise to an increased interest in the problem of the development of pathology of the skeletal system, which is relevant for modern pediatrics. The pathology of the skeletal system in childhood is primarily associated with vitamin D hypovitaminosis, which is one of the global medical problems of the healthcare system in most countries, including Kazakhstan (2). According to modern concepts, a personalized approach to diagnosis and treatment provides for genetic studies to predict the development and course of various diseases of childhood, including hypovitaminosis D (3). The study of the VDR and RANKL genes is of great interest. The VDR gene encodes the nuclear hormone receptor for vitamin D3, the subsequent targets of which are involved in mineral metabolism. The RANKL gene is a key factor in the differentiation and activation of osteoclasts, cells that mediate bone resorption.

Aim. To study the genetic polymorphism of hypovitaminosis D in young children of the Kazakh population.

Materials and methods. 104 children of the Kazakh population under the age of 1 year (60 boys and 44 girls) living in Aktobe were examined. The study for genetic markers was carried out for polymorphisms: VDR (rs1544410, rs2228570) and RANKL (rs9594738, rs9594759). The determination method was PCR in real time. Vitamin D was determined by electrochemiluminescent immunoassay.

Results. According to genetic analysis, the examined children were divided into groups, according to the distribution of genotypes. There were no significant differences in the distribution of genotypes C/C, C/T, T/T of the VDR (rs1544410, rs2228570) and RANKL (rs9594738, rs9594759) genes between young boys and girls ($p = 0.28442$). It was found that the RANKL gene polymorphism for rs9594738 was distributed as follows: C/C genotype occurred in 54%, C/T in 33%, T/T in 17% of children; RANKL by rs9594759 was distributed as C/C in 59%, C/T in 15%, T/T in 28% of children. VDR gene polymorphism for rs1544410 was distributed as follows: C/C in 52%, C/T in 31%, T/T in 17% of children; VDR rs2228570 was distributed as follows: G/G was noted in 76%, G/A in 20%, and A/A in 4% of children. The distribution by genotypes in young children of the Kazakh population corresponds to the available literature data for other populations. During the examination, it was recorded that 81 children (78%) showed a decrease in the level of vitamin D, among which 69 (85%) were found to be deficient, and 12 (14%) were found to be deficient in vitamin D. According to the level of vitamin D concentration, children were divided into 3 groups. In children with RANKL rs9594759 with the C/C genotype, there was a deficit in 58% of cases; a deficit was found in 78.8% of children with the C/T genotype and in 41.2% of those with T/T. RANKL rs9594738 with the C/C genotype was deficient in 57.8% of cases, C/T in 53.5%, T/T in 93.3%. VDR rs2228570 with the C/C genotype was deficient in 65.3 cases, C/T in 64.5%, T/T in 47.0%. VDR rs1544410 with genotype G/G was found to be deficient in 45% of cases, G/A in 64.0%, A/A in 100%.

Conclusions. The prevalence of vitamin D hypovitaminosis in children of the Kazakh population was 78%. The protective value of the C/C, G/G genotypes cannot be excluded. It is not yet possible to formulate a final opinion on the functional significance of polymorphism. The limitation of the first stage of the presented work is the insufficient number of observations, which does not allow us to draw final conclusions. Further research is needed. The results will clarify the relationship between gene polymorphism and hypovitaminosis D.

Polymorphism of vitamin D VDR receptor gene and mineral density of bone tissue in asian adolescent girls with primary dysmenorrhea

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Background. Dysmenorrhea is the occurrence of severe pain in the lower abdomen during menstruation. The vitamin D / vitamin D receptor (VDR) has been shown to suppress the inflammatory effects mediated by NF-ϰB. The exchange of calcium and phosphates in the bone tissue is regulated with the participation of vitamin D by the interaction of its hormone-active form, calcitriol 1,25 (OH) 2 D3, with the receptor cells. The receptor for calcitriol (vitamin D, VDR) (or NR1I1) belongs to the family of nuclear transcriptional proteins and is involved not only in transcription, controlled by microRNA. Among the hypotheses of menstrual dysfunction with vitamin D deficiency, neurohumoral regulation of the hypothalamic – pituitary – ovarian system is considered essential due to the localization of vitamin D receptors (VDR), in contrast to other vitamins, in the nuclei of various tissues and organs. However, over the past 10 years, data have been accumulated on the role of genetic polymorphism of the VDR gene in the pathogenesis of various manifestations of menstrual dysfunction. Some studies have shown a beneficial effect of cholecalciferol on menstrual irregularities such as oligomenorrhea and dysmenorrhea. With regard to the abundant data on the role of vitamin D, both traditional and recently published, there is a strong correlation between vitamin D deficiency and various other factors that determine a wide range of polymorphic clinical manifestations, where menstrual dysfunction is significant in girls at puberty. In this review, we discuss pathways involved in pain perception and processing, primarily at the level of dorsal root ganglion (DRG) neurons, and the potential interactions between vitamin D, its receptor (VDR), and known specific pain signaling pathways, including nerve growth factor (NGF), glial neurotrophic factor (GDNF), epidermal growth factor receptor (EGFR) and opioid receptors.

Aim. To study the diagnostic significance of the VDR genetic marker (rs731236) and the state of bone mineral density in adolescent girls with primary dysmenorrhea.

Methods. Research design is a cross-sectional study. The study involved 105 girls (12 to 18 years old) with primary dysmenorrhea. After obtaining informed consent from adolescents and their parents, a blood test was taken from a vein for the genetic marker 7014a-VDR (rs731236) in adolescent girls with primary dysmenorrhea. BMD was assessed using ultrasound densitometry.

Results. According to genetic testing, the subjects were divided into the following groups according to the distribution of alleles of the polymorphic marker vitamin D receptor VDR: T/C, C/C, and T/T. The first group consisted of 58 girls (56%) with the T/T gene; in group 2, C/C was in 5 girls (8%), and in group 3, T/C was in 41 (36%). The distribution of alleles of the intracellular vitamin D receptor VDR gene in adolescent girls with primary dysmenorrhea with normal BMD was as follows: carriers of T/T genotype – 12 (48%), carriers of C/C genotype – 1 (4%), carriers of T/C genotype – 12 (48%). In the second group with reduced and/or osteopenia, the distribution was as follows: carriers of T/C genotype – 26 (35%), carriers of C/C – 4 (5%), carriers of T/T genotype – 45 (60%). The C/C genotype did not depend on BMD.

Conclusions. It was determined that in 36% of adolescents with primary dysmenorrhea, the heterozygous T/C genotype was determined in both groups of BMD. The study of genetic markers indicates the need for an in-depth study of the state of BMD and further determination of the relationship between the presence of genotype variants in adolescent girls with primary dysmenorrhea.

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Vitamin D status in adolescent girls with primary dysmenorrhea

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Background. The National Guide to Gynecology (2009) defines dysmenorrhea as a violation of the menstrual cycle, manifested by painful menstruation and includes a wide range of neurovegetative, metabolic endocrine, mental and emotional abnormalities, the main manifestation of which is pain syndrome. The frequency of pain during menstruation, according to various researchers, ranges from 8% to 90% (1).

Many scientific articles have been analyzed on the problem of vitamin D deficiency. Despite the fact that the effect of vitamin D deficiency on the health of children and adolescents has been studied for a long time, information about the role of vitamin D in the formation of menstrual function in puberty girls is scant and ambiguous. Vitamin D plays a critical role in sexual development, possibly due to its effects on calcium homeostasis, cyclical fluctuations in sex steroid hormones, or bone mineral density and metabolism (2, 3).

Aim. A study of vitamin D levels in adolescent girls with primary dysmenorrhea.

Methods. 105 adolescent girls with primary dysmenorrhea at the age of 12–18 years were examined. Determination of 25 (OH) D in blood serum was performed by chemiluminescence immunoassay. Taking into account the supply of vitamin D, the following groups were distinguished: group 1 (n = 95) with an inadequate level of 25 (OH) D and group 2 (n = 10) with an adequate supply (30–100 ng/mL). Group 1 was divided into subgroup 1A (n = 34) with an insufficiency of 25 (OH) D (20–30 ng/mL) and subgroup 1B (n = 61) with a deficiency (< 20 ng/mL).

Results. General descriptive statistics revealed that the average vitamin D value was 19.8 ± 8.9 ng/mL, which indicates the lower limits of the reference values.

Against the background of primary dysmenorrhea syndrome, 90% of the subjects had an inadequate level of vitamin D, of whom in subgroup 1A (36%) the insufficient level was within 23.76 ± 4.9 and in subgroup 1B (64%) the deficiency level was within 14.21 ± 4.9.

Levels of 25 (OH) D in 105 adolescent girls with primary dysmenorrhea were inversely related to the score on a visual analogue scale (r = –0.137; P = 0.05).

Conclusions. The results of the study confirmed a high prevalence of inadequate vitamin D supply among adolescent girls with primary dysmenorrhea (90%), which is 64% in the deficit range. The data obtained clearly demonstrate that the period of the formation of the menstrual function in adolescence should be considered as a risk factor for the development of D-deficiency states, which increases against the background of violations of sexual development.

Acknowledgements. Authors declare the absence of conflict of interest. The study is funded by the Ministry of Education and Science of the Republic of Kazakhstan project IRN AP09563004.

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Section 2
Interdisciplinary approach in the actualization of theoretical and clinical medicine issues

An approach to the treatment of type 2 diabetes mellitus in the elderly

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Background. Type 2 diabetes mellitus is an age-associated disease with a continuous annual increase in the number of patients in the world population and a high mortality rate. In addition, this pathology, which is based on disorders of carbohydrate and lipid metabolism, is a risk factor for the development of diseases of the cardiovascular system, mortality from which is in the first place in our country. In this regard, the development of safe regimens for hypoglycemic therapy aimed at compensating for carbohydrate metabolism and dyslipidemia is extremely important.

Aim. To develop a treatment regimen for elderly patients with type 2 diabetes mellitus, aimed at compensating for carbohydrate metabolism, improving fat metabolism, without the risk of developing hypoglycemic conditions.

Methods. Our work is based on the analysis of the results of examination and treatment of 80 elderly patients (2 groups of 40 each) suffering from type 2 diabetes mellitus (mean age 68.25 ± 4.12 years) for 6 months. We analyzed the effectiveness of the correction of carbohydrate and lipid metabolism in elderly patients with type 2 diabetes mellitus proposed by "Method of treatment of elderly patients with type 2 diabetes mellitus" (patent for invention No. RU 2750523 C1 dated 06/29/2021).

Results. The proposed method for the treatment of elderly patients with type 2 diabetes mellitus after 6 months of therapy leads to the achievement of target indicators of carbohydrate metabolism, a significant decrease in the levels of total cholesterol ($P = 0.004$), LDL ($P < 0.001$), triglycerides ($P < 0.001$), growth HDL cholesterol ($P < 0.001$), and weight loss up to 5 kg. There were no episodes of hypoglycemia.

Conclusions. Polymorbid elderly patients with diabetes mellitus 2 require complex treatment, in the obligatory compensation of not only carbohydrate, but also fat metabolism. The proposed method for the treatment of elderly patients with type 2 diabetes mellitus leads to the normalization of carbohydrate metabolism indicators, positive changes in fat metabolism. This method of treatment must be introduced into clinical practice.

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To the question of the effectiveness of prenatal and neonatal screensing for congenital heart defects

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Background. In the world of modern technologies and innovations, the question of identifying and reducing mortality from congenital heart defects (CHD) in children remains open. Modern advances in cardiology and neonatal cardiac surgery have made the survival of children with congenital heart disease, which previously led to the death of the child, possible. The successful application of radical minimally invasive methods of correction makes it possible to eliminate defects in the early stages of a child's growth without irreversible consequences.

The aim of the study was to identify the effectiveness of prenatal and neonatal screenings and to analyze the structure of congenital heart defects in newborns, the outcome of diseases in the city of Zhezkazgan, Karaganda region.

Methods. We carried out a retrospective analysis of 40 histories of the development of newborns with congenital heart disease in 2019–2020 who received inpatient care in the pediatric department and in the intensive care unit at the level of the Multidisciplinary Hospital in the city of Zhezkazgan. The departments underwent a comprehensive examination (pulse oximetry, ECG, chest X-ray, ECHO-KG), consultation of narrow specialists, early rehabilitation, conservative and symptomatic therapy. Surgical correction of critical CHD was carried out in the conditions of the highly specialized National Scientific Cardiac Surgery Center in Nur-Sultan. Surgical care for newborns of the remaining CHD was provided in the regional cardiac surgery center in Karaganda according to the regionalization and severity of the defect. The control group consisted of 40 apparently healthy newborns born in the physiological department.

Results. Based on the analysis performed, the following conclusions could be drawn: as a result of prenatal ultrasound screening, fetal congenital heart diseases were detected in 62.5% of cases, which coincides with the literature data. Postnatally, during the first month of life, 17.5% of CHD cases were detected, while at 2–3 months of life, there were 20% of CHD cases. Defects of the heart septa (VSD, ASD and their combination) prevailed in the CHD structure. Newborns with multiple malformations accounted for 20%. A frequent combination with congenital pneumonia, perinatal hypoxic-ischemic lesion of the central nervous system, and lingering jaundice was revealed. Mortality by 1 month with congenital heart defects in newborns was 25% due to newborns with multiple malformations; survival after surgical treatment was 95%, and conservative management of newborns with congenital heart defects was applied in 32.5% of cases.

Conclusions. The results of the prenatal screening did not significantly affect the morbidity, mortality of newborns and the level of childhood disability with congenital heart defects during the analyzed period due to the refusal of parents in 20% of cases from the recommendations of specialists. It is necessary to include a psychologist in the perinatal council to work with a pregnant woman and her family in deciding whether to terminate a pregnancy if it is directly indicated.

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The ratio of deviations of body weight and various types of constitution in students of the 1-3 course of the NJSC "SMU"

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Background. In medicine, a constitutional approach to monitoring the development of a patient in normal and pathological conditions is increasingly observed. In this regard, it will be relevant to substantiate the relationship between the type of constitution and deviations of body weight.

Aim. A comparative analysis of the number and frequency of occurrence of various deviations of body weight in students with ectomorphic, endomorphic and mesomorphic body type.

Methods. The study was conducted at the NPJSC "Semey Medical University". In total, 368 students of the first to third year of study, aged from 18 to 23 years, participated in the study on a voluntary basis. The somatotype of each student was determined, and the body mass index was calculated. Then the number of students with different body types and body weight deviations was compared.

Results. 50% of boys and 36% of girls with the ectomorphic body type and 6% of boys and 4% of girls with the mesomorphic body type have a lack of body weight. Overweight and obesity are characteristic of boys (84%) and girls (89%) with the endomorphic type, as well as 5% of boys and 15% of girls with the mesomorphic type. Students with the ectomorphic body type, especially young men, are prone to a lack of body weight.

Recognition of the endomorphic type in children in the early stages of life allows us to anticipate the development of overweight in the future and with some probability make a judgment about their lifestyle, metabolic features, genetic and hormonal status. These results can be used to draw up an individual management plan for such patients for more effective correction of excess body weight.

Conclusion. Recognition of a certain somatotype in patients in different age categories with a certain percentage of probability allows us to judge their lifestyle, metabolic features, genetic and hormonal status. These results can be used to compile individual maps of the management of such patients at the prehospital stage. These data may have implications for predicting excess body weight and obesity. In addition, weight deficiency is important for monitoring the health of young men by doctors of the pre-conscription commission.

Combination of laparo-endoscopic techniques in urology for urolithiasis of the upper urinary tract

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Background. Over the past decades, many alternative methods of treatment to open surgery have appeared, including punctures, numerous techniques, various options for lithotripsy, and endovideosurgical operations.

Aim. To improve the effectiveness of minimally invasive methods of treating urolithiasis.

Methods. We present a clinical case with a combination of laparoscopic and endoscopic techniques, which took place in our clinic at ZKMU. Patient A (70 years old) presented with complaints of paroxysmal pain in the left lumbar region, dry mouth, nausea, and vomiting. The patient was ill for a week. The patient was examined according to the protocols of diagnosis and treatment: CT of the urinary system: Picture of urolithiasis. Concrement in / 3 of the left ureter (8.7x16.6 mm, 1758.1 H units), ureteropyelectasis on the left. On April 13, 2021, an operation was performed under endotracheal anesthesia: combined laparoscopic ureterotomy with transabdominal endoscopic pyelocalycolithotripsy on the left, and antegrade transabdominal stenting of the left kidney. The ureter was dissected with laparoscopic scissors, and urine was collected. When traction of calculus with forceps is performed, the latter migrates into the kidney cavity. Fluoroscopy was performed intraoperatively, on which the calculus is projected in the upper cup of the left kidney. It was decided to perform a transabdominal endoscopic pyeloscopy. A ureteroscope (6.5 Fr.) was inserted into the abdominal cavity through a trocar (10 mm), with pyelocalicoscopy, a calculus was visualized in the upper cup, which was fragmented with a holmium laser, and was pulled out with forceps. A stent catheter No. 4.8 Ch. was installed transabdominally. The postoperative period was uneventful, wound drains were removed on days 2–3, and the patient was activated on day 2. On day 5 after the operation, the patient was discharged in a satisfactory condition. Control ultrasound of the kidneys showed the following: the PCS is not dilated.

Results. The analysis of the presented cases demonstrates the following features of the clinical picture of laparoscopy of stones of the upper urinary tract: it is not uncommon for surgical interventions of the upper urinary tract for urolithiasis to be complicated by the migration of a calculus into the calyx-pelvic system of the kidney, and then it is practically impossible to extract the calculus. This is due to the fact that during traction of the calculus there is a liquid medium above it, which increases its mobility, thereby resulting in a high risk of migration. Laparoscopy and endoscopy of the urinary tract are fundamentally different from each other. To increase the efficiency of the operation, we conducted a combination of these surgical techniques, which in turn was unique, since endoscopic instruments were not originally intended for transabdominal use.

In most cases, with laparoscopic uretero-pyelolitomy, migrated calculi cannot be removed. In our case, the effectiveness reached 100% due to the combination of techniques.

Conclusions. For patients with calculi in the upper urinary tract, the most effective way is a laparoscopic uretero-pyelolithotomy with a pre-prepared endoscopic operating stand, which includes the presence of such instruments as a semi-rigid ureteroscope, a fibrouretero-renoscope with grasping forceps, and a holmium laser.

The combination of laparo-endoscopic techniques increases the efficiency of the operation, allows inspecting the pyelocaliceal system without damaging the kidney structure, thereby providing the possibility of traction of calculi and eliminating the risk of complications such as leaving calculus.

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Pathomorphological analysis of chronic gastritis among residents of Aktobe

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Background. The topic is relevant because the occurrence of chronic gastritis is the initial element in the pathogenesis of other stomach diseases. Chronic atrophic gastritis refers to precancerous conditions of the stomach. This disease is the beginning for such precancerous changes as intestinal metaplasia or dysplasia of the gastric mucosa, as well as hyper proliferation of the gastric epithelium. The severity of changes in the morphological picture of chronic gastritis significantly affects the clinical picture of the disease and the quality of life of patients. At present, convincing evidence has been obtained that the severity and activity of the inflammatory process in the gastric mucosa depends on the genetic structure of the helicobacter pylori (Hp) strain that caused chronic Hp-associated gastritis.

The essential reason for the occurrence of gastric cancer (GC) is a violation of cellular renewal, i.e., intestinal metaplasia and mucosal atrophy, which create the preconditions for epithelial dysplasia, an almost obligate precancerous condition.

Aim. To identify specific morphological changes in the gastric mucosa in chronic gastritis among residents of Aktobe in the age group from 30 to 50 years on the basis of histological studies of biopsy material using the OLGA method.

Methods. 150 series of micro preparations of the gastric mucosa (4–5 each, according to the modern classification of biopsies) formed a random sample of 401 biopsies of patients with chronic gastritis (general population). The study included only 50 biopsies, 25 for men and women each. All examined patients underwent EGD with biopsy of gastric mucosa and subsequent morphological analysis in accordance with the method of histological evaluation of biopsy specimens OLGA.

Results. Depending on the results of the study of biopsy material, morphological changes were as follows: 30% of patients showed inflammatory infiltration with pronounced edema, fullness, and infiltration with neutrophil leukocytes, 45% of patients had atrophic changes in the gastric mucosa, 25% of patients had foci of fine-intestinal metaplasia in some areas with gland hyperplasia, and there were also sclerotic changes in the gastric mucosa with the predominance of replacement fibrosis over metaplastic changes.

As a result of a morphological study of gastrobiopsy specimens of residents of Aktobe in the age group from 30 to 50 years, including a qualitative and quantitative analysis of the pathomorphological criteria of chronic gastritis, it was revealed that chronic gastritis in most cases was accompanied by atrophy of the glands and pronounced inflammation in the gastric mucosa.

In a morphometric study of the cell composition of infiltrates in the gastric mucosa, a significant increase in the number of lymphocytes, plasma cells and neutrophil leukocytes was found in surface and atrophic gastritis in the gastric membrane. Such changes indicate, in our opinion, the predominance of the exacerbation stage in various variants of chronic gastrits.

Conclusion. There is a tendency for gastric cancer to develop from chronic gastritis in the modern world, including Aktobe. The new classification of gastritis – the OLGA system – allows stratification of the risk of gastric cancer among patients with chronic gastritis, and solves the problem of assessing the regression of pathological changes in the mucosa as a result of treatment. Modern approaches to the treatment of chronic gastritis are strictly differentiated, aimed at the etiology and pathogenesis of each specific form of chronic gastritis. They not only prevent the development of peptic ulcer and gastric cancer, but also contribute to the regression of pathological processes in the gastric mucosa.

Placental growth factor–1 as a biomarker for early diagnostics of preeclampsia

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Background. More than half a million women die each year from pregnancy-related causes and 99% of these deaths occur in low- or middle-income countries (1). One of the main reasons leading to serious illness, long-term disability and death in mothers and babies is hypertensive disorders during pregnancy (2, 3).

Aim. The aim of this study was to assess the level of placental growth factor-1 in blood and urine in the first trimester and to search for diagnostically significant levels of placental growth factor-1 in blood and urine for early diagnosis of preeclampsia.

Methods. Open-label observational single-center cohort study. The selection and randomization of the subjects was carried out by simple random sampling by the method of generating random numbers. The following methods were used in the study: survey, general clinical examination, determination of proteinuria, determination of ALT and AST, determination of the level of platelets, determination of the level of placental growth factor-1 in the blood and urine carried out by the method of enzyme-linked immunosorbent assay using reagents for scientific research Human Placental Growth Factor ELISA Kit for serum, plasma cell culture supernatant and urine (Sigma Aldrich, Germany) on an automatic analyzer Dialab ELX808IU (Dialab, Austria) measured in pg/mL, ultrasound examination of the fetus in order to confirm or exclude intrauterine growth retardation.

Results. A total of 304 pregnant women were included in the study. The incidence of hypertensive conditions was 9.87% (6.86–13.93 95% CI), including gestational arterial hypertension 5.26% (3.14–8.57 95% CI), mild preeclampsia 2.63% (1.23–5.32 95% CI), severe preeclampsia 2.3% (1.01–4.89 95% CI) including eclampsia 0.6% (0.11–2.62 95% CI). The average levels of PLGF in the first trimester of pregnancy in group 1 in the blood and urine were 28.4 (9.74–37.6) pg/mL and 10.7 (6.75–22.4) pg/mL and were statistically significantly lower than the level of PLGF in the blood in comparison with group 2, while the level of PLGF in the urine in both groups had statistically significantly low values in comparison with the corresponding indicators of PLGF in the blood.

Conclusion. 1. The average level of PLGF in the blood during uncomplicated pregnancy in the first trimester of pregnancy was 36.57 (23.17–53.3) pg/mL.

2. The average level of PLGF in urine during uncomplicated pregnancy in the first trimester of pregnancy was 21.51 (14.8–36.4) pg/mL.

3. The average level of PLGF in the blood in hypertensive conditions is 28.4 (9.74–37.6) pg/mL, and in the urine, it was 10.7 (6.75–22.4) pg/mL.

4. The prognostic level of PLGF for preeclampsia in the blood was $\leqslant$ 11.37 pg/mL, while in the urine, it was $\leqslant$ 10.8 pg/mL.

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Quality of life of patients with glaucoma. Literature review

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Background. Quality of life is a complex and multidimensional concept that includes human health, physical and psychological well-being, as well as a good ability of social and cognitive activity. Glaucoma is one of the causes of disability among patients of working age in economically developed countries of the world. The study of the quality of life in patients with glaucoma could provide information about the dynamics of the development of the disease and would allow monitoring the effectiveness and tolerability of the treatment, as well as the development of possible complications. In this regard, in this paper we analyzed studies of the quality of life of patients with glaucoma.

Aim. To provide an overview of the literature data on the quality of life of patients with glaucoma for the last 5 years.

Methods. The search strategy for publications included the search for literature sources on the research topic indexed in the databases of the electronic library e-Library, Pubmed, Web of Science, Scopus, and Google Scholar. To compile the review, publications were studied over the past 5 years, from 2015 to 2021. The original languages were English and Russian. In total, 153 publications were analyzed, of which 40 articles were suitable for the purpose of the study. This study is based on previous research and does not include any new human or animal studies conducted by any of the authors.

The criteria for inclusion of publications for literature review were as follows:

- publications corresponding to the depth of search (2015–2021) in Russian and English;
- publications that were in full-text access, in Russian and English, bearing statistically verified conclusions;
- publications of the level of evidence A, B: meta-analyses, systematic reviews, cohort and cross-sectional studies.

The criteria for excluding publications from the literature review were as follows:

- summaries of reports, newspaper publications, personal messages;
- expert opinion in the form of short messages, advertising articles;
- publications with unclear conclusions, recurring publications, abstracts and conference materials;
- articles with paid access.

Results. According to the study, numerous publications show that loss of visual function is a major factor in the deterioration of the quality of life in glaucoma and can jeopardize the patient's daily activities, such as reading, driving, walking, assessing distances and observing objects approaching from the side. Patients with low educational attainment and monthly income had lower overall health scores. Awareness of the impact of glaucoma on human quality of life should be raised among clinicians, patients and their families. Researchers have identified the relationship between glaucoma, anxiety and depression. It is reasonable to assume a higher prevalence of psychological disorders in patients with glaucoma.

Conclusions. Early detection of glaucoma is a vital clinical challenge in order to preserve visual function and quality of life. This review emphasizes the importance of timely glaucoma diagnosis for maintaining vision-related quality. A link between glaucoma and depression was found, while advanced disease, older age, and faster progression of vision loss were identified as potential risk factors for depression in patients with glaucoma.

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The effect of bite on the development of temporomandibular joint dysfunction

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Background. Defects of teeth and dentition are a widespread pathology of the maxillofacial area and occur in 80%–90% of the adult population. In the absence of timely and rational treatment, the pathology is complicated by violations of the occlusive-articulatory relationship in combination with the pathology of the temporomandibular joint and masticatory muscles.

Aim. To assess the prevalence of violations of occlusion of teeth and dentition on the temporomandibular joint.

Methods. An analysis of temporomandibular joint (TMJ) pathologies was carried out in 40 patients aged 18 to 45 years. The patients were divided into 2 groups: the first included patients with impaired occlusion of the teeth and dentition (n = 22), and the second group consisted of patients with orthognathic occlusion (n = 18). The state of the temporomandibular joint was determined by the Helkimo dysfunction index. All patients underwent a photometric examination of the face, palpation of the masticatory muscles and the temporomandibular joint zone, direct biometric study of diagnostic models of the jaws, and determination of the nature of movements of the lower jaw by analyzing diagnostic models in an articulator. The study of teleradiograms of the head in frontal and lateral projections and orthopantomograms of the jaws was carried out.

Results. During the study, 16 patients (72.7%) in the first group had muscle hypertonicity compared with 6 patients (33.3%) in the second group. Pain on palpation of the masticatory muscles was detected in 14 patients (63.6%) in the first group and in 4 patients (22.2%) of the second group. TMJ pain was detected in 12 patients (54.5%) of the first group, and 7 patients (38.8%) of the second group. In the first group, clicking in the TMJ was detected in 16 patients (72.7%), and in the second group it was detected in 7 subjects (38.8%). Deviation was observed during movement of the lower jaw in 14 (63.6%) and 5 (33.3%) patients of the first and second groups, respectively.

Conclusions. The clinical research did not reveal a strong relationship between the structure of the temporomandibular joint elements and the type of occlusion anomaly. The position of the head of the lower jaw in the glenoid cavity correlated with the appearance of the malocclusion. Malocclusion anomalies in 27.3% of cases are not accompanied by manifestations of TMJ dysfunction, but there is only a mutual aggravation of these two processes. The pathology of the TMJ is not associated with a violation of occlusion, and with the progression of the disease, it leads to a violation of the synchronization of movement in the articular heads, their displacement and the formation of a pathological bite. Thus, a vicious circle arises: a violation of occlusion leads to a pathology of the TMJ, which in turn leads to a change in the position of the heads of the lower jaw and a violation of the bite.

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Clinical manifestations and causes contributing to the development of relapses of respiratory tuberculosis

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Background. Despite notable advances in diagnosis and treatment over the past decade, tuberculosis remains a global problem of critical importance. The main factors hindering the elimination of tuberculosis currently remain drug resistance of mycobacterium tuberculosis (MBT) and relapses of the disease, which in turn are a reservoir of tuberculosis infection. The frequency of recurrence of tuberculosis in the respiratory system as a proportion of re-detected cases of tuberculosis in CIS countries ranges from 1.5% to 41.4%, and varies between 0.3% and 25% abroad. According to the results of many studies, the development of recurrent tuberculosis of the respiratory organs is facilitated by residual changes in the lung tissue, the patient's separation from treatment, the presence of contact with patients with tuberculosis, concomitant diseases, drug resistance of MBT, long-term destruction of the lungs, etc.

Aim. Study of the causes of the development and clinical manifestations of relapses of respiratory tuberculosis.

Methods. To identify the causes of the development and clinical manifestations of recurrent tuberculosis of the respiratory system, we analyzed the data of the anamnesis and clinical and radiological examination of 30 patients who were treated at the Aktobe Regional Phthisiopulmonology Center in 2021.

Results. Among the studied persons, there were 9 women (30.0%), and 21 men (70.0%), 23 urban residents (76.7%) and 7 rural residents (23.3%). The average age of the patients was 48.3 years. Tuberculosis was detected during a routine examination in 5 people (16.7%), and in 25 people (83.3%) it was determined by referrals. In terms of the social status, the patients were distributed as follows: there were 17 unemployed (56.7%), 6 working (20.0%), 4 persons of the retirement age (13.3%), and 3 disabled (10.0%). Contact with patients with active tuberculosis was established in 6 cases (20.0%), alcohol abuse occurred in 5 people (16.7%), 3 (10.0%) had diabetes mellitus, HIV infection was observed in 1 patient (3.3%), 1 (3.3%) was released from prison and 1 patient (3.3%) used drugs. In terms of clinical forms, infiltrative pulmonary tuberculosis prevailed in 19 persons (63.3%), fibrocavernous tuberculosis was diagnosed in 7 (23.3%), disseminated tuberculosis in 3 (10.0%) and caseous pneumonia in 1 case (3.3%). Lung tissue breakdown was found in 19 people (63.3%). Bilateral localization of the process was observed in 16 patients (53.3%). Bacterial excretion was detected in 25 patients (83.3%). Drug resistance of the tuberculosis pathogen was established in 70.0% of cases. In 23 patients (76.7%), there were complications in the form of respiratory failure (11 patients, 47.8%), tuberculous intoxication (7 patients, 30.4%), hemoptysis (2 patients, 8.7%), pulmonary insufficiency (2 patients, 8.7%) and exudative pleurisy (1 patient, 4.3%). Concomitant diseases in patients with recurrent tuberculosis of the respiratory system were noted in 80.0% of cases, of which iron deficiency anemia was found in 50.0%, diseases of the gastrointestinal tract in 20.8%, diabetes mellitus in 12.5%, kidney disease in 12.5%, and HIV in 4.2%. Upon admission, 28 patients (93.3%) had symptoms in the form of cough, shortness of breath, chest pain, hemoptysis and symptoms of intoxication such as fever, decreased appetite and body weight, weakness, sweating occurred in 25 (83.3%). The severity of clinical manifestations depended on the prevalence of the tuberculous process.

Conclusions. Thus, the main reasons for the development of relapses of respiratory tuberculosis were the lack of permanent earnings (56.7%), contact with patients with active tuberculosis (20.0%), and alcohol abuse (16.7%). In 83.3% of the cases, relapse of pulmonary tuberculosis was detected by referral. Infiltrative pulmonary tuberculosis was most often diagnosed (63.3%), followed by common forms of pulmonary tuberculosis (53.3%), severe clinical manifestations (93.3%), complications of tuberculosis (76.7%), concomitant diseases (80.0%), the presence of destruction of lung tissue (63.3%), bacterial excretion (83.3%), drug resistance of MBT (70.0%).

carnitines concentrations for the diagnosis of inherited metabolic disorders

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Background. Among the diseases included in mass screening programs, hereditary metabolic diseases are especially important due to the development of disability and early mortality in the absence of timely diagnosis and treatment. To implement a mass study of newborns for hereditary metabolic disorders using tandem mass spectrometry (MS/MS) technology, it is necessary to conduct a study to determine the regional (in the population) reference values of metabolites.

Aims. Determination of regional reference values of physiological concentrations of metabolites (amino acids, carnitines) in the peripheral blood of healthy newborns in the Aktobe region.

Methods. In total, 95 clinically healthy newborns were examined using the MS/MS QSight ™ 210 MD PerkinElmer method. The average body weight was 3545.7 ± 477. There were 34 boys and 61 girls. Currently, the method of tandem mass spectrometry is the butylation of amino acids, acylcarnitines, and free carnitine. This analysis allows us to measure 75 metabolites used for simultaneous screening of 49 hereditary metabolic disorders. The markers were extracted from blood spots into a methanol solution with deuterium-labeled internal standards and then were derivatized before analysis by MS/MS. Discs approximately 3.2 mm in diameter were knocked out of dry blood stains and placed in the wells of a microplate. All data were expressed as mean ± SD. All statistical analyses were performed with Statistica version 10.0 (StatSoft, USA). According to the study, the distribution of the concentration ranges of amino acids and carnitines in no case obeyed the normal distribution law. In this connection, the calculation of 0.5 and 99.5 percentiles as reference values is optimal from the standpoint of descriptive statistics. Nonparametric tests were used to compare the data with non-normal distribution. $P \leqslant 0.05$ was considered significant.

Results. When solving the research problem, 0.5 and 99.5 percentiles of the concentration values of the studied metabolites were used as the reference value boundary. With this approach, the area of normal physiological values does not include 1% of extreme high and low concentrations of amino acids and carnitines in the peripheral blood of newborns. In this study, for the first time, the distribution of the concentration intervals of amino acids and carnitines in the peripheral blood of newborns from the Aktobe region was shown. The results of the study made it possible to establish which concentration intervals, depending on the metabolite, occurred more often than others, and which were random and formed an area outside the 0.5–99.5 percentiles. When comparing the obtained data on the concentration of amino acids and carnitines with the reference values of the manufacturer of the reagents Wallac Oy (PerkinElmer), it was revealed that there were certain differences. According to our data, the concentration of the amino acid proline was higher, and the concentrations of such amino acids as glycine, ornithine, methionine and carnitines (acetylcarnitine, propionylcarnitine, octenoylcarnitine, decenoylcarnitine, stearoylcarnitine) were lower than the reference values of the reagent manufacturer. The revealed differences require additional analysis.

Conclusions. The results showed the heterogeneity of newborns in the studied metabolites and the need to develop regional norms for the introduction of mass and selective screening for hereditary metabolic disorders by the MS/MS. The most common ranges of concentrations of metabolites (amino acids and carnitines) identified during the study will be the basis for a pilot study on mass and selective screening of children in the Aktobe region for inherited metabolic disorders.

Efficacy of minimally invasive therapy and laser therapy in the complex treatment of endoparodontal lesions

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Background. A complex pathomorphofunctional syndrome of combined periodontal and endodontal lesions is called endoporodontal syndrome. Endoporodontal syndrome is manifested by inflammation in the periodontium, which anatomically consists of two areas: apical and marginal. However, the marginal periodontium is an element of the periodontium of the tooth; in turn, the apical periodontium is an element of the endodontium. This anatomical and physiological proximity of these formations causes simultaneous involvement of the periodontium and the endodontium in periodontal inflammation, which requires a comprehensive treatment of this pathology.

Based on the above, there is a need to develop tactics for the treatment of endoparodontal syndrome against CGP, allowing to avoid surgical intervention, which defined the purpose and objectives of the present study.

Aim. Evaluation of the efficacy of minimally invasive therapy and laser therapy in the complex treatment of endoparodontal lesions against CGP.

Methods. We examined 60 patients (33 men and 27 women aged from 25 to 55 years) with apical periodontitis with mild CGP by the random sampling method. The control group of patients (25 people) underwent endodontic and periodontal treatment according to the clinical protocol of MH RK-2015. In the main group of patients (35 people), endodontic and periodontal treatment was carried out according to the clinical protocol of MH RK-2015, along with the use of minimally invasive therapy (MIT) on the device "Vector" and laser therapy.

Results. At clinical examination 7 days after treatment, patients in the main group who underwent MIT and laser therapy had significantly lower UIGR scores than those in the control group. Comprehensive treatment contributed to a significant decrease in UIGR by 0.2 points.

At 3 months after treatment, PI scores in both groups approached the best results, but significant improvement was noted in the main group.

At follow-up computerized visiography examination 6 months after implementation of the complex of therapeutic measures in the control group, the foci of bone tissue discharging in the apical part of the roots reduced to 2.3 ± 0.2 mm against the initial value of 2.7 ± 0.2 mm, and in the main group of the patients it reduced to 2.2 ± 0.2 mm against the initial value of 2.9 ± 0.2 mm.

Three months after treatment in the control group, the sIgA level increased by 16.6%, while in the main group this index approached the normal values. The lysozyme level in the control group three months after treatment decreased by 21.3% in relation to the initial data, and in the main group it decreased by 42.4%. Thus, in the course of the research, we revealed the fact of changes in the immune homeostasis in the given pathology, the mucosal immunity of the oral cavity functions in the stress mode. After the complex treatment, normalization of the indicators of local resistance was noted.

Conclusions. Thus, the inclusion of minimally invasive therapy and laser therapy in the complex treatment of endoparodontal lesions against the background of chronic generalized periodontitis promotes the creation of a healthy root surface, maintaining homeostasis between the resident bacteria and the macroorganism. In our opinion, minimally invasive therapy in periodontics can be applied after the initial phase of treatment, as an addition to professional hygiene measures, as an alternative to surgical interventions for mild disease according to the personalized approach, for treatment of root surface and periodontal pockets of various depths, and for patient management during the stages of maintenance therapy. Our own results testify to the high clinical effectiveness of the performed complex treatment with the inclusion of minimally invasive therapy and laser therapy, such indexes as improvement of patients' subjective sensations, reduction of periodontal pocket depth, normalization of hygiene index, periodontal index and local oral immunity index, reduction of parameters of the peri-tumoral bone resorption focus.

Introduction of a model for improving the health literacy of children and adolescents

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Background. The problem of health, development and upbringing of children and adolescents remains the most important task of modern society. Behavior formed in adolescence can affect such aspects as mental health in adulthood, the development of complaints about the occurrence of a number of non-communicable diseases, harmful actions, and the level of physical activity reduction (1). Conducting epidemiological studies to identify the leading risk factors for the lifestyle and quality of life of children currently corresponds to the main directions of the general struggle for the life and health of future generations (2). These data indicate that it is necessary to monitor the health status of young people and evaluate the effectiveness of health promotion measures (3).

Aim. To introduce a model for improving the health literacy of schoolchildren.

Materials and methods. The study was based on a questionnaire, interviewing, development of the implementation of the model.

Results. For implementation of the program to improve the literacy of schoolchildren about health in schools, we created a Committee to improve the literacy of schoolchildren about health. The creation of the committee involves the development of school projects on improving health literacy among students, assessing factors affecting a healthy environment, and exchanging information between stakeholders. The training of the members of the committee on nutrition and self-assessment of health status was conducted. The training was conducted for three days. The nutrition questionnaire consisted of 18 questions, and the answer had to be given by providing the correct answer. In both cases, the survey was conducted anonymously. After the completion of the action plan for the pilot groups of grades 5, 7, and 9, the members of the committee had a conversation on how useful and effective the measures to improve health literacy among students were.

Conclusion. Thus, the program for improving the health literacy of schoolchildren requires the creation of a committee with the involvement of teachers, students and parents. We developed and implemented a short action plan, including a survey of school students (grades 5, 7, and 9) on the topic of interest about health. Training will increase their awareness on a number of issues about healthy eating and the impact on health. Feedback from committee members defines barriers as the correct organization of the process with the active participation of students and teachers and the development of motivational activities for Committee members. The project is planned to be implemented among the age contingent of students in grades 5, 7, and 9, since at this age it is important to influence behavioral factors in a timely manner, improve knowledge in this area and increase interest in this problem.

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Assessment of cellular immunity in women with breast cance

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Background. Breast cancer is the most common neoplasm and the second leading cause of death in women, with breast cancer accounting for 22.9% of cancers in women and a recent lifetime risk estimate of 1 in 8. Breast cancer is the most common malignancy in women's population of Kazakhstan. More than 1.5 million new cases are registered in the world every year. More than 80% of breast cancers are found late. Immunity plays an important role in the immune surveillance of tumors and can limit the development and growth of neoplasms. Breast cancer, the most common cancer among women, represents a significant burden on our society.

Aim. To study the indicators of cellular immunity in women with breast cancer.

Methods. The study involved 100 patients with a clinical diagnosis of breast cancer. Biomaterials were studied in 100 women, before and after chemotherapy, of whom 48 were in the study group and 52 were in the control group. The main populations of lymphocytes were determined from blood samples using laser flow cytometry.

The study was carried out in the Department of the Scientific Laboratory of Molecular Genetics of the ZKMU Marat Ospanov Medical Center.

Results. In patients with breast cancer after chemotherapy, compared with the control group, significant changes in the parameters according to the data of cellular immunity were established. In particular, the phenomena of immunosuppression were observed. Based on the results in patients who received chemotherapy, there was a 41% decrease in CD3–CD19+ lymphocytes; at the same time, the level of CD4–CD8+ lymphocytes increased by 1.1%; CD3+/CD16+56+ increased by 11.9%, compared with the control group. The indicators of natural killers NK (CD16+56+) – 15.45 ± 8.7 – increased by 33.9%. T helper (CD4+CD8+) – 42.8 ± 12.6 – with a difference of 1.0 increased in the research group.

Conclusions. The activity of T-lymphocyte subpopulations providing the effectiveness of cellular antitumor immunity may be useful for predicting the clinical course of breast cancer before and after chemotherapy.

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The relationship between the immune status and the biocenosis of the vagina in women with breast cancer

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Background. The main reason for the recurrent course of bacterial vaginosis is the lack of function of the nonspecific immunity of the vagina, in particular, its antimicrobial, cytokine, and bacterial links (1). Being independent components of the general system, at the same time, they are able to interact with each other, increasing the efficiency of the body's defense during the introduction of a pathogen (2).

Aim. To determine the relationship between the immune status and the biocenosis of the vagina in women with breast cancer (BC).

Methods. In the **studied** women, using cytometry, the state of the cellular link of immunity was determined according to 9 indicators: T-lymphocytes (CD3+CD19–), B-lymphocytes (CD3–CD19+), T-helper (CD+CD8–), *T-cytotoxic (CD4–CD8+), IRI (immunoregulatory index), (*CD3+HLA–DR+) (activated E-lymphocytes), CD3–HLA–DR+NK (CD16+56+) - natural killers, T-killers (CD3+/CD16+56+). All indicators of the cellular link of immunity showed normative boundaries, except for two: T-cytotoxic (CD4-CD8 +) and CD3 + HLA-DR + (activated T-lymphocytes).

During the enzyme-linked immunosorbent assay (ELISA), the average values of humoral immunity were revealed: IgA, IgG, and IgM were within normal limits.

Results. The following analysis of the vaginal biocenosis by the PCR method reflects 14 indicators of the normal flora of the vagina: representatives of the normal flora, facultative anaerobic flora, obligate anaerobic flora, yeast fungi, and mycoplasmas. Normal values were found in representatives of the normal flora (Lactobacillus spp.), facultative anaerobic flora (Staphylococcus spp.) and obligate anaerobic flora (Lachnobacterium spp., Mobiluncus spp. and Atopobium vaginae). The indicators of Gardnerella vaginalis, Eubacterium spp., Sneathia spp., Megasphaera spp., Peptostreptococcus spp., Candida spp., Mycoplasma hominis were above normal, which indicates the presence of bacterial vaginosis, vaginal candidiasis, nonspecific vaginitis, and mycoplasmosis in these women.

The next stage consisted of identifying the correlation between the immune status (cellular and humoral links) and indicators of vaginal biocenosis. The relationship was identified between cellular immunity and vaginal biocenosis: T-lymphocyte Atopobium vaginae $r = 0.4$ ($P < 0.02$), and this indicates an average direct correlation in terms of reliability.

Between the T-killer and Eubacterium spp., an inverse correlation was revealed in terms of significance, $r = -0.2$ ($P < 0.04$). The next indicator of the cellular link shows average correlation $r = 0.4$ ($P < 0.03$), which is significantly reliable.

To identify correlations, the humoral link of immunity was also taken into account, in which there were correlations between IgG and Megasphaera spp. ($r = -0.4$; $P < 0.03$) and also between IgA and Mobiluncus spp. ($r = -0.5$; $P < 0.01$), with a strong inverse relationship.

Conclusions. It is currently considered proven that the main reason for the development of diseases associated with a violation of the normal biocenosis of the vagina is the malfunction of the immunobiological homeostasis of the microorganism; so, on the one hand, a violation of the normocenosis causes suppression of local immune reactions, and on the other, against the background of a decrease in immunobiological protection, conditions arise for the implementation of the pathogenic action of microbes, which, in turn, further aggravates the immunological failure of the body.

Assessment of the effectiveness of antiviral therapy for hepatitis C virus during the period of sustained virologic response

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Background. Chronic hepatitis C is the leading cause of liver disease and hepatocellular carcinoma worldwide (1). The main goal of HCV therapy is to cure the infection, i.e., to achieve a sustained virologic response. A sustained virologic response corresponds to a cure of HCV infection, since a late relapse occurs in less than 0.2% of cases after 6 months of follow-up (2). Studying the clinical effectiveness of antiviral therapy in patients with chronic viral hepatitis C makes it possible to evaluate the effectiveness of a particular type of treatment not only from the doctor's perspective, but also from the patient's perspective, which is fundamentally important, since their views often do not coincide.

Aim. To evaluate clinical efficacy of combined antiviral therapy of patients with chronic viral hepatitis C in the period of steady virological response.

Methods. A total of 105 patients suffering from CHCV were included in the study. The average age of the patients was 46.8 ± 11.8 years, and the duration of infection was 2.65 ± 1.8. All patients were treated for 12 weeks with sofosbuvir 400 mg + daclatasvir 60 mg (SOF+DCV). The health status was assessed at the time of study inclusion (0) and at 12 weeks of therapy (period of sustained virologic response). Statistical processing of the results was performed using Statistica 10 software. The Pearson $\chi 2$ was used to assess the significance of differences in the frequencies of observations.

Results. Having compared health indicators before combined antiviral therapy and in the phase of rapid virological response, we found that the proportion of patients who complained of heaviness in the right subcostal area decreased from 77.1% to 34.2%, ($P \leqslant 0.005$). Statistically significant decreases were observed in the following ($P \leqslant 0.001$): weakness from 100% to 37.1%, headaches from 86.6% to 49.5% ($P \leqslant 0.001$), decreased work capacity from 86.6% to 73.3% ($P \leqslant 0.001$), sleep disturbance from 61.9% to 55.2% ($P \leqslant 0.001$), and abdominal bloating from 60% to 47.6% ($P \leqslant 0.001$). On week 4 of antiviral therapy, there was a significant increase in the proportion of complaints of nausea (from 66.6% to 84.7%, $P \leqslant 0.001$) and vomiting (from 21.9% to 28.5%, $P \leqslant 0.001$).

Conclusion. Thus, when assessing the patient's condition at 12 weeks of combined antiviral therapy, some improvement in mesenchymal inflammatory and astheno-vegetative syndromes was observed. However, there was a significant increase in complaints of dyspeptic syndrome, which seems to be associated with the side effects of antiviral drugs.

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Lactobacteria and colonization resistance of the intestine in children

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Background. The mechanisms of colonization resistance (RK), realized with the participation of lactobacilli, are based on antagonistic interbacterial interactions. To ensure colonization resistance, lactobacilli produce a large amount of organic acids, lysozyme (muramidase), hydrogen peroxide, as well as bacteriocins and microcins. Organic acids (lactic, acetic, succinic) maintain the pH of the intestinal contents at 4.0.

Interest in the study of human microbiocenoses is dictated by practical necessity.

The aim of this work was to study and assess the main biological properties of lactobacilli colonizing the intestines of children in normal conditions and their role in ensuring the colonization resistance of the intestines.

Methods. The material for the study was the feces of 87 healthy children. Previously, the degree of dysbacteriosis in the examined individuals was determined using an express method for diagnosing intestinal dysbiosis by caseinolytic activity of the feces supernatant, from which lactobacilli were then isolated. Identification of the isolated strains of lactobacilli was carried out using the api 20 A test system "bio Merieux" (France) API WEB. The antagonistic activity of lactobacilli was detected by the method of delayed antagonism according to L. P. Blinkova. To reveal the acid-producing ability of lactobacilli, the acid-forming activity was determined by a titrometric method. The detection of the production of enzymes of pathogenicity of lactobacilli was carried out by conventional methods. We studied lecithinase, caseinolytic, adhesive, hemolytic, antilysozyme, catalase and gelatinase activity. The degree of adhesion of lactobacilli was determined using the average adhesion index (AAI) according to the method of V.I. Brilis on human erythrocytes of O (I) group Rh+. The sensitivity of lactobacilli to antimicrobial drugs was determined by the disk-diffusion method on Muller-Hinton medium in accordance with the methods recommended by NCCLS.

Results. The cultural, morphological and tinctorial properties of bacteria have been studied to determine whether they belong to the Lactobacillaceae family and the Lactobacillus genus. To isolate antagonistically active strains of lactobacilli, a study of bacterial antagonism was carried out by the method of perpendicular strokes on a solid nutrient medium with the selection of strains.

The isolated strains of lactobacilli were tested for sensitivity to antibiotics. The acid formation activity depends on the composition of the nutrient medium and the cultivation conditions.

When studying the adhesive activity of lactobacilli, it was found that lactobacilli had an average degree of adhesiveness and, thus, were capable of long-term persistence in the gastrointestinal tract and providing colonization resistance without translocation to internal organs.

Conclusions. The lactobacilli studied by us have a whole set of biological properties (the ability to adhere to the intestinal epithelium, active acid formation, the absence of pathogenicity factors, pronounced antagonistic properties, high biological activity), necessary to ensure colonization resistance and maintain local immunity in the gastrointestinal tract.

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Features of bone mineral density in adolescent girls with primary dysmenorrhea

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Background. Dysmenorrhea is a serious health problem for adolescents, as well as for medical practitioners, which negatively affects the daily activities and quality of life of adolescent girls. Today, one of the urgent problems of pediatric and adolescent gynecology is dysmenorrhea. Teenage girls with dysmenorrhea represent a high-risk group for menstrual dysfunction and the formation of reproductive system pathology. Based on the results of several studies conducted, it should be noted that severe menstrual pain associated with primary dysmenorrhea affects the quality of life depending on the overall health. Bone mineral density is a measure of bone density. Features regarding bone remodeling and deficiencies in diagnostic knowledge related to bone health are associated with primary dysmenorrhea in adolescent girls.

Aim. To assess bone mineral density (BMD) in adolescent girls with primary dysmenorrhea.

Methods. We examined 105 adolescent girls with primary dysmenorrhea at the age of 12–18 years. The state of BMD was assessed using ultrasound osteodensitometry, which was carried out through the calcaneus using a SONOST-3000 South Korea osteodensitometer device. According to the state of BMD, adolescent girls were divided into three groups: group 1 (n = 21) – Z-score norm ($\geqslant -1$), group 2 (n = 79) – Z-score osteopenia (–1–(–2.9)), and group 3 (n = 5) – osteoporosis Z-score ($\geqslant -3$);

Results. The average age of the surveyed adolescent girls was 15.6 ± 1.7 years. Other values were as follows: height – 160.2 ± 7.2 cm; weight – 53.5 ± 9.9 kg; BQI – 78.2 ± 13.7; SOS – 1516.2 ± 13.7 (m/s); BUA – 77.0 ± 19.0 (dB/MHz); BMI – 20.7 ± 2.7. In normal group 1, the mean value of height was 162.6 ± 6.7 cm; weight was 54.4 ± 9.5 kg; BQI was 95.1 ± 11.8; SOS was 1534.096 ± 12.3 (m/s); BUA was 86.7 ± 16.3 (dB/MHz), and BMI was 20.4 ± 2.7. In group 2 with osteopenia, the values were as follows: height – 159.4 ± 7.2 cm; weight – 53.2 ± 10.0 kg; BQI – 73.0 ± 9.3; SOS –1510.6 ± 8.4 (m/s); BUA – 74.0 ± 18.8 (dB/MHz), and BMI – 20.8 ± 2.7;

Anthropometric indicators such as height, weight, and BMI had a weak positive correlation with the indicators of osteodensitometry, r = 0.3

Conclusions. Thus, the obtained data prove the importance of further in-depth study of the relationship between body mass index and bone mineral density, since the main factors of peak bone density in adolescent girls are age and the onset of sexual age.

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Age-related characteristics of the antitumor immune response in women with breast cancer

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Relevance. Breast cancer (BC) is the most common malignant tumor among the female population of the planet and continues to be the most urgent problem of oncology and medicine in general. The age of patients plays an important role both for the risk of breast cancer and for the course and prognosis of the disease. The effect of age on the development of tumors depends on the age-related characteristics of the immune system – one of the most important factors that control tumor growth and affect the effectiveness of various types of anticancer therapy (1). The immune system responds to tumor growth both locally and systemically, and circulating immune cells have prognostic value. Therefore, the study of the subpopulation composition of peripheral blood lymphocytes (PC) in breast cancer patients of different age groups is relevant, and the results obtained can serve as a basis for a differentiated approach to the appointment of antitumor treatment, taking into account the differences in the immune response to the tumor in patients of different ages.

The aim of the research was to study the parameters of the immune response depending on the age of women with breast cancer before and after chemotherapy treatment.

Methods. The study included 48 women (18–44 years – 16.7%; 45–59 years – 31.2%; 60–75 years – 52.1%) with breast cancer, stage T1-2 N0-2 M0. Determination of the subpopulation (CD3+CD19; CD3–CD19+; CD4+CD8–; CD4–CD8+; CD3+HLA-DR+; CD3–HLA-DR+; CD16+56+) lymphocytes was performed using laser flow cytometry with monoclonal antibodies.

Results. Regardless of age, CD4–CD8+ and CD3+HLA-DR+ indices, without statistical significance, are higher than the permissible values both before and after chemotherapy. Indicators CD3+CD19–, CD4+CD8– are within the physiological norm. However, the statistically significant decrease was noticed in CD4+CD8– ($P \leqslant 0.036$) after chemotherapy at the age of 18–44, in CD3–CD19+ indicators at the age of 45–59 ($P \leqslant 0.025$) and at the age of 60–75 ($p \leqslant 0.037$). Indicators CD16+56+ ($P \leqslant 0.029$) increased in the age range of 18–44 years.

Conclusion. An increase in the absolute number of CD8+T cells is a prognostic criterion for tumor response, and CD3+HLA-DR+ is an indicator of prolonged activation of the systemic antitumor immune response. Of course, tumor growth modulates the immune response to foreign antigens; however, age-related differences in the immune response seem to persist.

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Actual problems of medicine

Clinical course of the gastroduodenal zone diseases in children

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Background. The combination of organic pathology of the gastroduodenal zone with functional diseases is to be an actual problem of pediatrics. The reasons of this "symbiosis" are various and it is often difficult to determine them. Functional diseases are not seldom a starting up mechanism in the development of gastroduodenal pathology or stable supporting factor.

Aim. To study the clinical course of the diseases of the gastrodental zone in children taking on the backbone of the functional disturbances.

Methods. The materials of the investigation were 110 children with gastroduodenal zone diseases. The children underwent standard clinical investigations, fibrogastroduodenoscopy with biopsy and helicobacter determination as well as estimation of the vegetative state according to the vein scale.

Results. There were 14% of children up to 10 years, 40.5% were aged from 10 to 12 years, and 45.5% were more than 12 years of age. In the clinical picture, 100% of children had complaints of epigastrial pains, 34% of eructation, 27% of heartburn, 10.5% of periodical vomiting, and 18.5% of constipation. In 52% of the investigated cases, the disease was revealed for the first time. During biopsy investigation of the material, helicobacter was found in 86% of the cases.

During fibrogastroduodenoscopy, functional disturbances were revealed in 41% of children. Gastroesophagal reflux with the development of reflux-esophagitis was determined in 13% of children, spastic duodenogastral reflux in 28%, and reflux caused by pylorus ostium in 14% of children.

The vegetative state investigation revealed the presence of vegetative disfunctions in 89% of patients. Vagotonic symptomatology (hyperhydrosis of palms and feet, bad tolerance of transport and stuffy apartments, "depressing sighs") predominated. But the markedness of these symptoms was more noticeable in children with accompanying functional disturbances. In these children, the disease debuted at an earlier age of 10–12 years and recurrences were met more often.

Conclusion. Our investigations show that the diseases of the gastroduodenal zone in 41% of the cases are accompanied with functional disturbances of the gastrointestinal tract. The presence of vegetative disfunctions contributed to an earlier debut of gastroduodenal pathology and tendency to its recurrence. This all demands to introduce the proper correcting measures into the treatment of gastroduodenal zone diseases.

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Structure and morphometric indicators of the myocardium at the combined exposure of compounds of chrome and boron

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Background. The article presents the results of an experimental study of the rat myocardium under the combined effect of chromium and boron compounds on the body. The combined effect of chromium and boron compounds on the body causes pronounced vascular disorders such as hemorrhages, disorders of the microvasculature, and dystrophic processes in the myocardium with pronounced pathomorphological changes.

Aim. It is well known that the chemical composition of the environment has a significant effect on the body, and therefore, the features of the chemical composition are the cause of many pathological conditions in humans and animals. In the literature, there is not enough information about the morphological state of the heart when the body is exposed to chromium and boron compounds. In this regard, this experimental study is relevant.

Methods. The material for the study was the hearts of 40 sexually mature white outbred female rats weighing 154.0 ± 45.0 g. The animals were injected intraperitoneally with a solution of potassium dichromate and boric acid at a dose equal to 1 MPC for drinking water. The animals were taken out of the experiment on days 1, 7, 15, and 30 under light ether anesthesia in compliance with the "Rules for working with experimental animals" (approved by order of the Ministry of Health of the Republic of Kazakhstan dated 19.08.1997, No. 8.01.003.97.).

The weight and dimensions of the hearts were determined. For histological examination, pieces of the heart were fixed in a 10% solution of neutral formalin. Histological preparations were made according to the generally accepted technique: posting and embedding the material in paraffin. Sections of 3–5 μm were prepared from paraffin blocks, which were then stained with hematoxylin and eosin. Morphometric measurements were carried out using the Image J program (USA) and a Pentium IV computer (Windows). The area of the parenchyma and stroma, and the area of cardiomyocytes and their nuclei were determined. When describing histological preparations of the heart, we were guided by the practical recommendations of Zornoff et al. (2009). Statistical processing of the results was carried out using the software package for PC "MicrosoftExel 7.0", "STATISTICA 10.0".

Results. The weight of female rats in the experimental group on days 1, 7 and 15 of the experiment did not differ from the weight of the control rats. On day 30 of the experiment, a decrease in the weight of the rats of the experimental group by 40.0 g was established (at $P < 0.01$). The heart weight of rats in the experimental group on all days of the study did not differ from the control. The heart volume of the rats of the experimental group on the days 7 and 15 was 1.5 times lower than that in the control (at $P < 0.05$). In the control group, the wall thickness of the left ventricle was on average 2.7 times greater than the thickness of the right, and in the experimental group, it was only 2.2 times greater.

Conclusions. Analyzing the received data, we found that the combined effect of chromium and boron compounds causes pronounced vascular disorders such as hemorrhages, disorders of the microvasculature, dystrophic processes in the myocardium with pronounced pathomorphological changes, as well as dystrophic changes in cardiomyocytes. A statistically significant relationship was revealed between the pathomorphological signs of the myocardium under the combined effect of chromium and boron compounds in rats of the experimental group on the entire day of the study.

Experience in laparoscopic nephrectomy from a living donor

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Background. Today, kidney transplantation is the only radical treatment for patients with end-stage renal failure. Removal of a kidney from living donors using the endovideo-laparoscopic technique has been carried out since 1995. Living donor laparoscopic nephroureterectomy (LNE) was developed and implemented at Thomas Jefferson University in Philadelphia (USA) by surgeons Kavoussi L. R. and Ratner L. E. This technique of nephrectomy is an alternative to the traditional method and is widely spread and gaining popularity. LNE is most preferable for the removal of kidneys from living donors, as it minimizes traumatic aggression in the donor and improves visualization of all structures of the donor organ during the operation.

Aim. The purpose of this study is to provide the first experience in the implementation in Aktobe of transperitoneal manual-assisted laparoscopic nephroureterectomy (MALNE) from living donors for transplantation on the basis of the Aktobe Medical Center (AMC).

Methods. Since 2014, 24 kidney transplants from living related donors have been performed on the basis of AMC. Of these, 18 operations were performed using the laparoscopic technique of removing a donor kidney with manual assistance. In all cases, the left kidney was removed. In the last 2 cases, the 3D laparoscopic imaging technique was used. The indications for nephroureterectomy were immunological histocompatibility according to the results of HLA phenotyping, negative cross-match test, compatibility for the AB0 system, absence of acute infectious processes, infectious diseases such as AIDS/HIV, syphilis, and active phases of viral hepatitis B and C. We used an endoscopic stand made by Karl Storz (Germany). For manual assistance, a special port was Gel-port or LAP-port. This device consists of 2 rings connected in a circle with a silicone film. The rings are attached to the abdominal wall from the inside and from the skin. A silicone membrane is inserted into the lumen of the rings, which allows the operator's hand to enter the abdominal cavity and maintain tightness. In addition to mono- and bipolar coagulation, an ultrasonic scalpel is preferred. In our case, we used an ultrasonic scalpel "Harmonic" (Ethicon, USA). Hemolock plastic endoclips were used to treat the main renal vessels.

Results. The average duration of the organ harvesting operation was 122.1 ± 11.7 minutes. With the endoscopic method, a wider and more complete visual and manual control of the entire surgical area from the diaphragm to the small pelvis is carried out (which is important in overweight patients). The use of a stapler and clips to extract the kidney reduces the time of heat ischemia. In all cases, after kidney implantation to the recipient, the initial urine was released immediately after graft reperfusion. The total blood loss averaged 25–50 mL. There were no complications in donors in the immediate and late postoperative periods. Patients after laparoscopic nephrectomy experience a much lower need for pain relief, and they are activated on the second knocks after the operation. An important advantage of the endovideoscopic method of kidney collection is the cosmetic effect. Donors were discharged 5–7 days after surgery.

Conclusions. This technique, due to the enlarged image, minimizes damage to the small structures of the organ and tissues, which is very important, especially in the presence of additional vessels of the kidney. It also significantly reduces the amount of blood loss, shortens the postoperative period, and significantly reduces the risk of complications.

Thus, laparoscopic donor nephroureterectomy in the regions of Kazakhstan is actually feasible and requires widespread implementation in the practice of transplantology.

Assessment of cognitive function by moca scale in patients with COVID-19

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Background. The second year of the COVID-19 pandemic has shown the need to identify and assess the long-term consequences of SARS-CoV-2 infection, including adequate cognitive functioning (CF). Initially, COVID-19 was considered exclusively a respiratory syndrome, but today more and more studies indicate that SARS-CoV-2 infection is also able to penetrate the central nervous system. Recent data show that patients who have recovered from COVID-19 may be exposed to acute and post-restorative cognitive impairment (CI). "Cognitive COVID" can manifest as altered levels of consciousness, symptoms like encephalopathy, delirium, and loss of various memory regions.

Aim. To study the cognitive status and detect CI (if any) in patients with COVID-19 in the acute period of the disease who are on inpatient treatment.

Methods. The prospective study was started after the approval of the Ethics Committee of the West Kazakhstan Medical University named after Marat Ospanov (permission No. 6 (782)) and obtaining the informed consent of patients. In the period from February 1 to April 30, 2021, 428 people (247 women, 181 men) were examined in 2 repurposed dispensary hospitals in Aktobe. The inclusion criteria were age from 18 to 59 years with a positive result of a PCR test and the presence of at least one recently acquired neurological symptom, the ability to understand spoken language, the absence of taking psychotropic drugs, depression, dementia and urgent conditions (stroke, myocardial infarction). Clinical neurological examination and standard neuropsychological examination were performed using the MoCA (Montreal Cognitive Assessment) scale on the day of hospitalization and on the day of discharge from the hospital. CI is defined as a score less than or equal to 26 of 30. Statistical processing using Microsoft Excel and Statistica 10 was conducted.

Results. After conducting a correlation analysis, it turned out that CI does not depend on gender. The correlation analysis between age and the result of the MoCA test turned out to be negative; therefore, patients of the older age group had low scores compared with younger patients (10–17 and 19–24 points, respectively). It was found that 387 patients (67%) had a MoCA test score < 26 points, which was < 24 points 2–3 weeks after treatment. The comparison of the results of MoCA with the length of hospital stay showed a negative relationship, which indicates a possible deterioration of CF during a long stay in the hospital. Speech, abstraction and orientation were not violated.

Conclusion. Thus, in patients with COVID-19, regardless of gender, 67% of patients had cognitive deficits. We recommend that clinicians evaluate the need for cognitive assessment of patients with recent COVID-19 infection, regardless of the severity of the disease, treatment methods and duration of stay in the intensive care unit.

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EEG alpha rhythm reactivity during words perception in typically healthy children and children with receptive speech disorder

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Background. The formation of speech is one of the key factors of human development; therefore, it is important to investigate the mechanisms underlying the violations of the process. Both "classical" auditory zones and zones involved in wide range perceptual, affective and motor processes are currently suggested to play an important role in the speech perception process.

It has been suggested that the neocortex motor and somatosensory zone activation during speech perception is caused by the kinesthetic images and words association, which was repeated many times when interacting with others when mastering various movements in the early ontogenesis stages.

Some authors conclude that "perception-action" neural circuits play an important role in the speech understanding processes. Neurons in "perception-action" circuits are capable of providing both the speech signal perception and generation. An important subgroup of the "perception-action circuits" neurons is mirror neurons, which are activated both when performing actions and when perceiving similar actions. In particular, it was shown that articulatory motor zone activation takes place during both speech generation and speech listening. Despite the available data on the relationship between speech disorders and the frequency of epileptiform and local (with a predominance in the temporal regions) pathological change detection on the EEG as well as on some EEG rhythm formation degree, specific EEG patterns reflecting impaired speech understanding have not yet been identified. Of particular interest is the EEG pattern study in children with speech impairment, whose EEG did not reveal pathological activity during standard clinical EEG examination.

Aim. The study analyses of EEG patterns during words (nouns and verbs) perception in typically developing children and children with speech understanding impairments (F80.2)

Methods. The individual EEG alpha rhythm reactivity during words (nouns and verbs) perception in 15 typically developing children and 14 children with receptive speech impairment (F80.2) aged 4 to 10 years was analyzed.

Results. The significant decrease of the alpha rhythm amplitude in the frontal and temporal leads (when listening to nouns) and in the left frontal region (when listening to verbs) in the typically developing children was revealed as compared with the stable visual attention situation, whereas in children with receptive speech impairment no such changes were observed.

Conclusions. The absence of significant alpha rhythm amplitude changes in children with impaired receptive speech may indicate the lower activation of zones associated with the object or action contemplation, motor articulatory zones and the temporal zones involved in the speech acoustic-phonetic analysis.

Ethnic features of vascular wall stiffness

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Background. Despite the introduction of new methods of diagnosis and treatment of cardiovascular diseases, this category of diseases remains the main cause of death worldwide. According to the world health organization, 17.1 million people die annually from irreversible disorders of coronary and cerebral circulation (1). For timely detection of changes in the activity of the cardiovascular system, clear age standards of primary indicators are necessary. However, in addition to the age for setting average standards for this population, it is necessary to take into account the ethnic-territorial affiliation (2).

Aim. Study of the state of the cardiovascular system among the young population of two different ethno-territorial groups: students from Kazakhstan and India.

Methods. A comprehensive and clinical and instrumental examination of 90 male students of the first to the third study years of the West Kazakhstan Medical University named after Marat Ospanov was conducted. Accordingly, the ethnicities of the subjects were divided into two groups (group 1 – students of Kazakh nationality; group 2 – students of Indian nationality). Angiological screening was performed using The BPlab –Vasotens device at the Marat Ospanov WKMU medical center. The calculation of vascular wall stiffness was performed automatically in the laboratory of the manufacturer using standard methods and using the Vasotens Office application software package. The results were measured at least 3 times with stabilization of the readings. The results were processed using descriptive statistics and non-parametric statistical methods using the STATISTICA 10 software package.

Results. In the study of height and weight, the indicators were statistically significantly higher in group 1 (height: group 1, 178.0 [175.0–182.0]; group 2, 173.0 [168.0–176.5], P = 0.00004), (weight: group 1, 69.5 [62.0–78.0]; group 2, 61.0 [57.0–72.0], P = 0.009). In group 1, the pulse arterial pressure was higher than in group 2 (group 1, 128.0 [119.0–135.0]; group 2, 120.0 [115.0–129.0], P = 0.02). It is worth noting that there were no statistically significant differences in the level of DAP (group 1, 68.5 [65.0–72.0]; group 2, 70.0 [66.5–74.0], P = 0.169). According to the above fact, pulse blood pressure was significantly higher in group 1 (group 1, 58.0 [52.0–66.0]; group 2, 50.5 [42.0–57.5], P = 0.0002). When comparing arterial rigidity, a statistically significant increase in the PWVao index was found in group 1 (group 1, 8.7 [8.1–9.3]; group 2, 8.2 [7.75–8.8], P = 0.02). According to the augmentation index (Alx, %), a statistically significant difference was also determined (group 1, –74.0 [–79– (–70.0)]; group 2, –67.0 [–73.0–(–61.0)], P = 0.0004). A statistically significant difference was also observed when assessing the maximum rate of increase in blood pressure (group 1, 874.0 [719.0–960.0]; group 2, 749.0 [598.5–882.0], P = 0.005).

Conclusions. This study concluded that students from India and students of Kazakh nationality had a number of differences when comparing vascular stiffness. We believe that these differences are related to the constitutional peculiarity of the studied groups.

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Genetic study of predisposition to myocardial infarction

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Background. Myocardial infarction (MI) is one of the most common multifactorial and polygenic diseases of the cardiovascular system. More attention is being paid to research on the role of genetic polymorphism in the formation of predisposition to MI, extending these studies to the relationship with other phenotypes: the nature of the clinical course of MI (the occurrence of complications), the development of repeated cardiovascular events, and the individual effectiveness of a particular drug (pharmacogenetics). Such studies can expand the current understanding of the etiology and pathogenesis of MI, as well as facilitate the prognosis of the development and course of the disease and the choice of medications. Hereditary predisposition to myocardial infarction is studied by various methods, including family history, and determination of candidate genes by genome-wide association studies (GWAS analysis).

Aim. Review of the results of research and literature on the study of genetic predisposition to myocardial infarction by GWAS analysis.

Methods. A literature search was performed through PubMed, Medline, ProQuest, Cochrane Central Register of Controlled Trials, Clinicaltrials.gov and Web of Science databases from inception until September 2021. Search strings contained MESH terms and key words such as Myocardial Infarction, Single Nucleotide Polymorphisms (SPN), and Genome-Wide Association Studies (GWAS).

Results. Research on the genetic predisposition to MI is actively conducted in the USA, France, Germany, Ireland, Netherlands, China, Japan, and Russia. SNP of the genotype GG of the ITGA4 gene (rs1143674), CC of the CDKN2B-AS1 gene(rs1333049), CC of the KIAA1462 gene(rs3739998), AA of the ADAMDEC1 gene(rs3765124), GG of the AQP2 gene (rs2878771) and TT of the TAS2R38 gene have been associated with the risk of MI (rs1726866) in the Siberian population. 16 loci have a significant or presumptive association of GWAS with MI among ethnic Saudi Arabs. Two other SNPs on the same gene, rs10757274_G and rs1333045_C, rs9982601_T on KCNE2 have been associated with MI. 6 SNPs rs12413409 from CNNM2, rs264 from LPL, rs9369640 from PHACTR1, rs9319428 from FLT1, rs599839 from PSRC1 and rs4977574 from CDKN2B-AS1 are the loci of susceptibility to IM in Japanese. It is also noted that the polymorphism associated with MI may differ in people with different lipid profiles.

Conclusions. The determination of genotypes for SNP is informative for assessing the genetic risk of MI. Genetic polymorphisms of predisposition to them have not been sufficiently studied in Kazakhstan. In this regard, the GWAS study is relevant, which will allow for early diagnosis of MI and prevention of persons predisposed to this disease in the Kazakh population.

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Optimization of rating scales for hernias at the lumbar level in the early postoperative period

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Aim. Analysis of the results of surgical treatment in the early postoperative period for patients with herniated discs at the lumbosacral level in the context of optimization using rating scales.

Methods. In a group of 170 patients operated on between January 2019 and January 2020, questionnaires and assessment scales were distributed: visual-analog scale (VAS), Osverti quality of life questionnaire, Macnab subjective assessment scale (Macnab), and Prolo functional-economic outcome scale.

Results. As a result, 55.2% of the patients indicated rapid relief of pain in the early postoperative period. According to our calculations, 3% of the patients reported negative dynamics, as well as increased back pain after surgery. A significant proportion of the patients (48%) at the early postoperative stage noted recovery of sleep without the use of painkillers and sedatives.

Conclusion. In our opinion, the best way to assess pain in the preoperative period is to use a visual-analog scale and a subjective evaluation scale. As for the early postoperative period, it is more effective to use the Oswerti quality of life questionnaire to assess functional and economic outcomes and working capacity of patients.

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The use of platelet-rich plasma in rats

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Aim. The aim of this study is to study the role of platelet-rich plasma (PRP) on the healing of ureteroneocystoanastomosis (UCA) in a rat model.

Methods. A total of 7 male Sprague-Dawley rats were divided into two groups: Group 1 (n = 3): standard anastomosis without PRP; Group 2 (n = 4): standard anastomosis with PRP. The animals were observed for 7 days, and then killed. The parameters of the study were complications of anastomosis, evaluation of hydroxyproline and histopathological evaluation of anastomoses.

Results. The level of hydroxyproline was statistically higher in the PRP group than in the control group ($P < 0.05$). Histological evaluation of the anastomoses showed almost complete healing in all animals. The average histological parameters of the animals in the groups did not differ.

Conclusions. According to our results, we assume that the use of PRP improves the healing of the anastomosis due to the level of hydroxyproline and a decrease in the inflammatory response. Further clinical studies are needed to confirm our hypothesis.

Correlation between placental growth factor (PIGF) in blood and urine with the outcome of pregnancy and delivery

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Background. Preeclampsia and premature birth are eternal topical problems in obstetrics. These are two main reasons for the death of infants in the periodical period, as well as the development of severe conditions. Over the past few years, the rate of preterm birth has not decreased in any way, despite all the efforts made by obstetricians and their patients.

Aim. The aim of this study was to correlate the level of placental growth factor (PIGF) in blood and urine in the first trimester with the outcome of pregnancy and childbirth.

Methods. 304 pregnant women by weeks 10–14 chosen by the method of the simple random sampling with the exception of high-risk factors for complications were included in this study. A single-center prospective cross-sectional study was carried out. The gestational age was determined by the date of the last menstruation and by ultrasound fetometry. PIGF levels in blood and urine were determined by enzyme immunoassay on the Dialab ELX808IU analyzer (Dialab, Austria) using reagents for scientific research Human Placental Growth Factor ELISA Kit for serum, plasma cell culture supernatant and urine (Sigma Aldrich, Germany). Correlations between two quantitative traits were performed using the Spearman correlation criterion.

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Results. Blood and urinary PIGF levels in the first trimester of pregnancy (10–14 weeks) were as follows: in studied groups, PIGF level in the blood was 36.6 (12.8–50.03) pg/ML, PIGF level in the urine was 24.46 (14.6–40.6) pg/mL, $P < 0.05$, in comparison with the indicators of the studied group: PIGF level in the blood was 35.18 (22.5–51.2) pg/mL, PIGF level in the urine was 20.42 (13.79–34.14) pg/mL, $P < 0.05$. It was revealed that the PIGF level in the blood and the urine has a strong positive correlation with the premature luing-ins of $r = 0.762$, $P < 0.05$, and a meaningful cross-correlation with the urgent luing-ins of $r = 0.605$, $P < 0.05$.

Conclusion. The PIGF level in the blood and the urine has a strong positive correlation with preterm twin delivery, $r = 0.762$, $P < 0.05$, and accordingly, with term delivery, a significant positive correlation, $r = 0.605$, $P < 0.05$.

Smoking and alcohol abuse as risk factors for low-energy

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Background. Osteoporosis is a metabolic disease of the skeleton characterized by a decrease in bone mass per unit volume, a violation of the structural and strength characteristics of bone tissue and, as a consequence, an increase in the risk of fractures (1). Annually, osteoporosis causes more than 8.9 million fractures of various bones of the skeleton (2).

Osteoporosis remains an important social and medical problem, considering the moral and material costs associated with the fractures associated with it. In men, this disease is studied less often than in women; however, according to European Study of Spinal Osteoporosis, 13.5% of men over 50 and 26% over 60 years old are at high risk of fractures against the background of the disease (3). The question of risk factors for both the disease and fractures against its background remains poorly understood, although, unlike women, men have a risk of death after a fracture that is higher by 1.6 times. One of the reasons for this increase in mortality is the lack of knowledge about the risk factors of the disease and its complication, such as a fracture. The increase in the incidence of osteoporosis among the male population indicates the relevance of measures aimed at the formation of a healthy lifestyle. In this regard, the assessment of the effect of smoking and alcohol abuse on the risk of fractures in patients with primary osteoporosis is an important aspect of the prevention of the disease and fractures against its background.

Aim. To assess the role of smoking and alcohol abuse in the formation of bone mineral density deficiency (BMD) and the relationship of these bad habits with the risk of fractures - markers of primary osteoporosis in men.

Methods. An open comparative controlled study was conducted in which men with primary forms of osteoporosis participated. The work was carried out in accordance with the ethical principles and rules of quality clinical practice of the Helsinki Declaration. All patients received informed consent for examination and data processing. The study included 231 patients with primary osteoporosis aged 18 to 82 years, who were observed in polyclinics in Aktobe.

Results. The analysis did not reveal significant differences in bone mineral density deficiency in the compared groups of smokers and non-smokers. There was also no effect of alcohol abuse on the amount of bone mineral density deficiency.W did not note the connection of absolute values of bone mineral density (g/cm2) with such bad habits as alcohol abuse and smoking. Fractures of the proximal femur were more common among smokers (20.2% vs. 8.8%) and fractures of the vertebral bodies (44.1% vs. 27.3%). Among non-smokers, 31.9% of patients had no fractures, compared with smokers (9.5%). The differences between smokers and non-smokers were significant ($P < 0.001$). A sequential analysis showed that significant differences concern patients without fractures (there are significantly more of them ($P < 0.001$) in the non-smoking group) and patients who had fractures of the vertebral bodies (there are significantly more of them among smokers ($P < 0.001$)). Fractures were also significantly more common among people who abuse alcohol ($P < 0.001$), i.e., only 10.2% did not have fractures, while there were no fractures among 33.8% of those who did not drink alcohol.

Conclusions. The assessment of the association of smoking and alcohol abuse with the risk of fractures – markers of osteoporosis – was studied in 231 patients with primary osteoporosis. Fractures were significantly more common among smokers: 90.5% vs. 68.1%, ($P < 0.001$). This concerns fractures of the proximal femur and fractures of the vertebral bodies: 20.2% vs. 8.8% and 44.1% vs. 27.3%, respectively. Alcohol abuse also increased the risk of fractures: 89.8% vs. 66.2%, respectively ($P < 0.001$). Significant differences were noted only for vertebral fractures: 43.9% vs. 23.6%, respectively, among those who did not abuse alcohol ($P < 0.001$). Thus, evidence was obtained of a reliable association of smoking and alcohol abuse with the risk of fractures of the vertebral bodies and the proximal femur.

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On the creation of exoskeletons for verticalization of patients

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Background. Exoskeletons of the lower body, designed for the rehabilitation of patients, have become an excellent alternative to traditional expensive equipment due to their mobility, ease of use and the possibility of complex development of the lower limbs in an upright position, which reduces the overall rehabilitation time.

However, existing exoskeletal devices have a number of disadvantages to be improved such as: the lack of a system for automatically maintaining balance when walking, the occurrence of pain in the places of contact between the exoskeleton and a person during use, large dimensions, the weight of the system and noise during operation of the device, the inability to recreate the rotation of the hip and ankle joints in three planes and others.

Aim. The aim of this work is to set goals and objectives for designing an exoskeleton that meets the requirements of consumers to a greater extent and to identify promising areas for further research.

Methods. In the course of the work, technical characteristics, consumer reviews and scientific publications on the use of such exoskeletons as ExoAtlet I, ExoAtlet II, ExoLite, FreeWalk, PHOENIX, Honda Walking Assist, Indego Therapy, EKSONR, ReStoreStore, ReWalk Personal, and Hybrid Assistive Limb, manufactured in the Russian Federation, USA, Japan, Taiwan, South Korea, Canada and Germany, were researched. In addition to researching existing commercial proposals for lower body exoskeletons, a patent review and a review of the most cited publications on the subject of lower body exoskeletons in such databases as Scopus, Web of Science, E-library, FIPS, USPTO, EAPATIS and others were carried out.

Results. Based on the results of an analytical review of the market for medical exoskeletons of the lower body and publications on this topic, the authors identified three main goals for further developments in the field of creating medical exoskeletons: ensuring the safety of the user when using the exoskeleton, ensuring the independence of the patient from others, and reducing the rehabilitation time. It is possible to achieve the goals set by performing the following tasks: ensuring automatic balance maintenance, introducing restrictions on the movement of joints, modularity of the exoskeleton, providing feedback to the patient, and providing complex movement of the ankle and hip joints according to the anatomical features of the structure of the musculoskeletal frame.

Conclusions. The authors formulated the goals and objectives of designing an exoskeleton device that meets the requirements of consumers to a greater extent in comparison with existing models, and also identified promising directions for further research in the field of creating lower body exoskeletons for patient rehabilitation:

- development of a schematic solution of the knee and ankle joints, taking into account the displacement of the axes of rotation when walking, according to anatomical features, to reduce pain effects during use;
- development of an exoskeleton device, taking into account the degree of stiffness of the sole, the presence of an instep support to reduce pain effects in the knee joint; ensuring rotation of joints in three perpendicular axes and their combinations, according to anatomical features, to improve blood circulation and shorten the rehabilitation time;
- development of individual circuit solutions for characteristic changes in musculoskeletal tissues.

Hygienic assessment of nutrition of schoolchildren aged 10–14 in Aktobe

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Relevance. Nutrition is a sustainable factor important for the growth, development and health promotion of children and adolescents. Proper nutrition is one of the constantly acting factors throughout the ontogenesis, on which the successful education of the child, resistance to adverse environmental factors and health status depend. According to the WHO, more than half (54%) of the death causes of children under the age of 5 from various diseases are associated with malnutrition (1). The study is associated with frequent violations of a healthy diet, which leads to a deterioration in the life and health of children. Healthy nutrition plays an important role in ensuring the quality of life of a child, their physical and mental health, and life expectancy. Rational nutrition is the nutrition of healthy people, taking into account age, gender, nature of work, climate features and other factors. Proper nutrition ensures the effective functioning of the digestive system, the absorption of nutrients and regulates metabolic processes (2). Optimizing nutrition is not only a medical problem, but also a social one. Scientists have identified problems that can lead to diseases such as growth retardation, anemia, osteoporosis and diseases of the gastrointestinal tract if the child's body lacks vitamins, minerals, and trace elements (3).

Aim. To give a hygienic assessment of the nutrition of schoolchildren aged 10–14 in Aktobe.

Methods. The object of the study was schoolchildren of Aktobe. The study involved 457 adolescents, including 207 girls (45.2%) and 250 boys (54.7%) living in Aktobe. The sample was attended by schoolchildren aged 10 to 14 years. The design of the study is a one-step, cross-sectional study. Food Frequency questionnaire, developed by the University of Cambridge, was employed. Taking into account the peculiarities of nutrition of residents of Kazakhstan, the original version of the in Kazakhstan may lead to distorted results.

Results. The study revealed a deficiency in the diet of adolescents of calcium (846.3 ± 228.3), iodine (59.3 ± 30.9), sodium (145.8 ± 80.2), phosphorus (849.4 ± 562.3), carbohydrates total (235.1 ± 84.8), milk and dairy products (345.9 ± 258.08). The energy value was 1645.5 ± 402.8 kcal, i.e. 854.5 kcal is not enough compared with the normal indicator.

Conclusion. Thus, the results of the study show that the average daily intake of calcium, iodine, sodium, and phosphorus by Aktobe schoolchildren does not correspond to the physiological needs of macronutrients. However, in half of the cases, an excess of the average daily intake of these micronutrients and vitamins was detected.

Recommendations. Due to the lack of calcium, it is necessary to give children milk and dairy products, or vitamin calcium. Sodium is found in eggs, beets, meat products, and cucumbers. Phosphorus is found in milk, dairy products, as well as in green products, and vegetables (parsley, peas, spinach, potatoes, pumpkin). It is recommended to eat seaweed, as well as fish (hake, pollock, tuna, etc.), eggs, and peanuts, which contain iodine.

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Causes and toxicology of argirosis

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Background. At present, due to the development of industrial and chemical technologies, the production of chemicals has increased significantly. It is clear that these factors also affect human health. One of them is that there are many causes of salt poisoning in the silver salt industry. It can become a chronic form of the disease and can be latent. Excessive amounts of chemicals in the body cause certain pathologies.

At present, the treatment of these diseases is not fully understood, so it is important to know the etiology. Only in this way one step can simplify the treatment of the disease.

Aim. To identify complications, taking into account the etiology and pathogenesis of argyrosis, and to explain safety measures when working with toxic substances.

Methods. In the course of research, the effect of silver nitrate (lapis), one of the best water-soluble salts of silver, on the body was proved experimentally. We considered the effect on the blood and the reaction in the stomach. Influence of antiseptic properties of the product was analyzed by the silver.

Results. In industrial settings, the powdery form of silver disrupts gas exchange when inhaled into the alveoli, leading to the development of bronchial asthma. The effect of silver nitrate, which we showed experimentally, has a negative effect on the body during postprandial poisoning. Adding silver salts to distilled water and drinking it for a long time can also lead to poisoning. When ingested through the mouth, it reacts with hydrochloric acid: $AgNO_3 + HCl = AgCl\downarrow + HNO_3$. From this reaction, we can see that the hydrochloric acid is neutralized and replaced by water-insoluble silver chloride. Its main effect is the stagnation of sediment in the body without passing through the small intestine, the passage of small particles of sediment into the blood. At this time, blood clots may form. If the level of hydrochloric acid in the stomach is less than the amount of silver nitrate, the excess silver nitrate is absorbed into the blood. In this case, the stages of the reaction are different: $AgNO_3 \rightarrow Ag^+ + NO_3^- Ag^+ + 2NO_3^- + 2OH^- = Ag + 2HNO_3 + O_2$.

This reaction shows the effect of silver salt on the blood. In this reaction, silver nitrate is hydrolyzed by water in the blood. This leads to the accumulation of silver in the cells and the formation of active forms of oxygen. These processes can be considered as the pathogenesis of poisoning. Poisoning can also occur if you drink silver-treated water for a long time. Accumulated silver in the body also affects the blood vessels. In this case, it leads to the development of atherosclerosis. It can be located in any part of the body.

For example, if it is located in the coronary arteries of the heart, it leads to gradual necrosis of the myocardium. For example, Paul Carason, an American, showed signs of myocardial infarction after drinking water treated with silver salt for a long time. In this case, it develops after a breakdown of the metabolic system in the body. In addition, due to the high antiseptic properties of silver salts, it burns the mucous membranes of internal organs.

Based on the results of the study, we conducted an experiment on artificial modeling of the pathogenesis of argyrosis by recording the reaction, the interaction of hydrochloric acid and lapis lazuli. These reagents have given us a great opportunity to reveal the pathogenesis of argyrosis.

Conclusions. The results of the study showed that, after the development of argyrosis, there were complications. It is important to follow safety precautions to prevent silver salt poisoning. It is especially important for people working in industries to protect their airways with masks and gas masks. Because silver is a heavy metal, its compounds are toxic and undergo hydrolysis. However, at present the disease is rare, and is found only in people in the workplace. Prevention of a disease, for which the treatment is not fully proven, is the most effective way.

Analysis of hemodynamics by young people before and after short-term listening of various music styles

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Background. Research in physiology has demonstrated that music has a significant impact on activity of brain regions, which are responsible for emotions and autonomic regulation. Music also stimulates synthesis of biological substances, which affect stress-resistance of the human organism. It was established that a result of impact of music on the autonomous nervous system (ANS) depends on the beat, the tonality, the intensity of the sound and other characteristic. ANS has a direct influence on the parameters of hemodynamics, which are among the human health markers. And through these parameters, we can make a conclusion about effects of various styles of music on the organism.

Aim. Evaluation of the dynamics of hemodynamic parameters before and after short-term listening to music of different genres.

Methods. We conducted the research of 70 people (average age 22.2 ± 1.9 years old). They were divided into groups: in the 1st group, there were respondents (n = 35), who listened to an audio-recording with several classical compositions, lasting 11 minutes 11 seconds; in the 2nd group, there were subjects (n = 35), who listened to an audio-track, lasting 13 minutes and 5 seconds, which includes musical works by modern artists of different genres (house, pop rap, trap, hip-hop, Russian rap). We registered initial hemodynamic parameters by all respondents using the Korotkov`s method: systolic blood pressure (SBP) and diastolic blood pressure (DBP), pulse, and also the Kerdo index for an evaluation of the functioning of ANS. Then we registered hemodynamic parameters by respondents again after a short-term listening of classical and modern music. We mad data analysis using methods of nonparametric statistics: medians and percentiles [ME, (p25; p75)]; Wilcoxon criterion (T), Mann-Whitney criterion (U), Statistica 8.0 program.

Results. Intragroup analysis in both 1st and 2nd groups demonstrated that SBP and DBP corresponded to the age norm. No reliable changes were found in both initial and final parameters. Pulse characteristics were significantly reduced in the 1st and 2nd groups of respondents (T, P = 0.002; P = 0.01, respectively). The evaluation of parameters of the Kerdo index did not demonstrate reliable values. Intergroup analysis revealed that pulse characteristics and Kerdo index values were significantly lower in the respondents of the 1st group (U, P = 0.03; P = 0.006, respectively), in contrast to the 2nd group (U, P = 0.03; P = 0.006, respectively), at the beginning of the research and after listening to music for a short time

Conclusions. Short-term listening of favorite music by respondents, classical or modern, has a predominant effect on the parasympathetic nervous system, which is confirmed by changes in the values of pulse and the Kerdo index.