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EFFECT OF ORGANO-MINERAL COMPOSTS ON COTTON YIELD IN SALINATED LANDS

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Abstract: This article highlights the importance of using organo-mineral composts to improve the efficiency of cotton cultivation in saline soils. Due to their poor agrotechnical properties, saline lands have a negative impact on the yield of agricultural crops, particularly cotton. During the study, composts prepared from various organic materials (manure, glauconite agro-ore, and licorice waste) were tested. Their effects on cotton growth, development, and final yield were analyzed. The results showed that the use of organo-mineral composts had a positive impact on reducing soil salinity, improving the agrochemical properties of the soil, and increasing cotton productivity. Notably, the application of 22 tons of organo-mineral compost containing a mixture of 16 tons of manure, 3 tons of glauconite, and 3 tons of licorice waste significantly optimized the cotton vegetation period and considerably improved both the quality and quantity of the yield. The article also discusses the ecological and economic advantages of this method. The findings of the study serve as a scientific and practical basis for establishing sustainable agriculture in saline-prone regions.

Key words: Soil, cotton, organo-mineral compost, manure, organic and mineral fertilizers, licorice waste, productivity.

INTRODUCTION. In the present day, the rational and efficient use of land resources - particularly for agricultural production on saline soils - has become one of the most pressing issues. In Uzbekistan, the salinization level of irrigated lands, which constitute a significant portion of the country's agricultural area, is increasing year by year. As a result of salinization, the physical, chemical, and biological properties of the soil deteriorate, severely affecting plant growth, development, and ultimately, crop productivity [4, p. 284; 6, p. 236]. Therefore, it is necessary to develop modern, ecologically safe, and economically viable agrotechnical measures to improve crop production efficiency on saline soils.

In recent years, the use of organo-mineral composts has been recognized as an effective method for enhancing the productivity of saline lands. These composts contain not only organic matter but also mineral components rich in macro- and microelements. They play a crucial role in improving the physicochemical properties of soil, regulating water

regimes, increasing the activity of beneficial microorganisms, and restoring soil structure [3, pp. 34-39; 7]. Moreover, composts prepared using organic wastes (such as manure and licorice processing residues) and natural mineral resources (such as glauconite, phosphorite, and bentonite) are considered cost-effective, environmentally friendly, and suitable for sustainable agriculture [5, pp. 19-23; 8, pp. 28-31].

Cotton is a leading technical crop in Uzbekistan's agriculture, and its productivity is directly influenced by soil conditions, nutrient balance, and proper implementation of agrotechnical practices. The results of research conducted by Egamberdiyev indicate that under saline conditions, the growth phases of cotton, photosynthetic activity of leaf surface, root system development, and the ability to form fiber yield are significantly reduced [2, p. 192]. From this perspective, the application of organo-mineral composts in saline soils can improve agro-ecological conditions, stabilize yields, and enhance soil fertility.

This study investigates the effects of various compositions of organo-mineral composts-recommended for saline soils-on the growth, development, and productivity of cotton. The composts were prepared using manure, glauconite, and licorice waste in specific ratios and evaluated under experimental conditions. Based on the research results, the effectiveness of these mixtures was assessed in terms of reducing soil salinity and increasing cotton yield. These findings provide a scientific and practical foundation for the development of sustainable agriculture in saline-affected regions.

MATERIALS AND METHODS. The experiment was conducted using the field method. The yield indicators of cotton were determined and subjected to dispersion analysis using the methodology described in Dospekhov's "Методика полевого опыта" [1].

The research consisted of 4 replicates of 9 options, and the options were arranged in a systematic manner. In the control variant, the full annual rate of mineral fertilizers was applied at N250, P175, and K125 kg/ha. In the other variants, the rates of mineral fertilizers were reduced to N185, P130, and K90 kg/ha. In variants 2 to 4, organic fertilizer (well-decomposed cattle manure) was applied under plowing at rates of 10, 15, and 20 tons per hectare, respectively.

In variants 5 to 9, organo-mineral composts were prepared by mixing well-decomposed cattle manure, glauconite agro-ore, and licorice processing waste in different proportions and applied under plowing. Specifically: compost-1 was applied at 12 t/ha (6 t manure + 3 t glauconite + 3 t licorice waste), compost-2 at 14 t/ha (6 t manure + 5 t glauconite + 3 t licorice waste), compost-3 at 20 t/ha (16 t manure + 1 t glauconite + 3 t licorice waste), compost-4 at 22 t/ha (16 t manure + 3 t glauconite + 3 t licorice waste) and compost-5 at 24 t/ha (16 t manure + 5 t glauconite + 3 t licorice waste).

RESULTS AND DISCUSSIONS. The average cotton yield across different organo-mineral compost treatments during the 2021–2023 experimental period is presented in Figure 1. These results serve to evaluate the influence of various agro-technical measures—particularly organo-mineral composts—on the growth and productivity of cotton in saline soils.

During the study years, a certain decline in yield was observed across all treatments. This reduction may have been caused by natural climatic conditions, water availability, soil salinity levels, and other agro-ecological factors. Nevertheless, in treatments where organo-mineral composts were applied, the decrease in yield was notably less severe compared to the control treatment. For instance, in Variant 1 (control), yield declined from 25.7 to 23.8 centners per hectare, whereas in Variant 8, it decreased only slightly from 31.9 to 29.9 centners per hectare, maintaining a relatively high and stable yield level. This suggests that the application of composts improved the physical, chemical, and biological properties of the soil, thereby enhancing the plant's resistance to environmental stress.

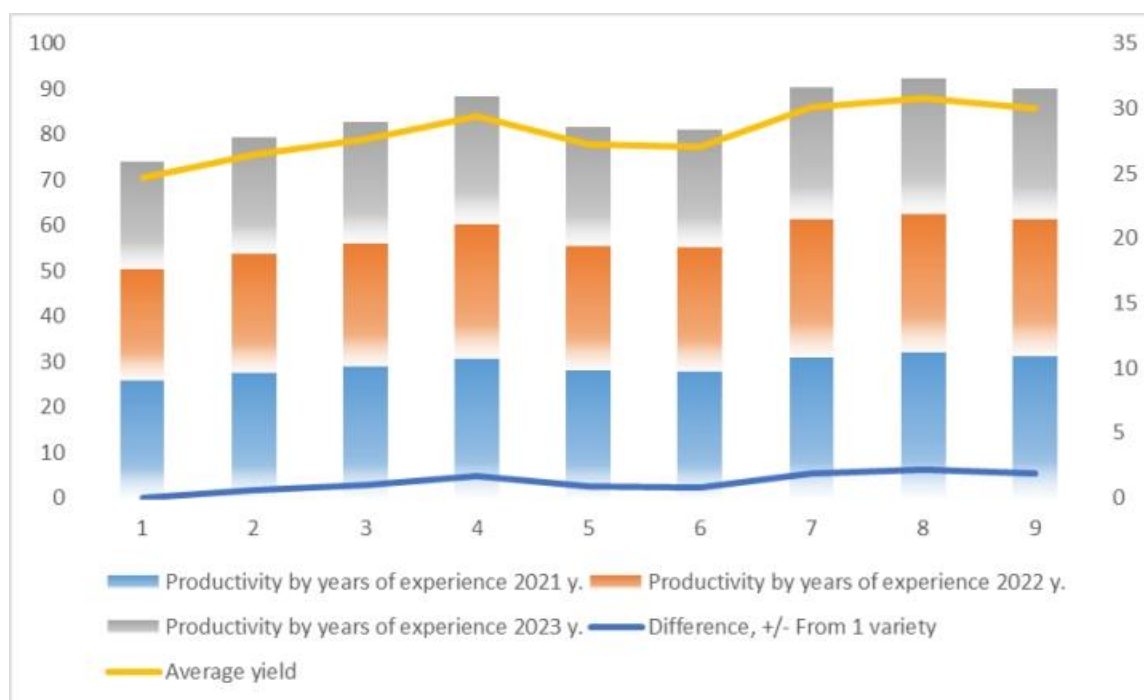


Figure 1. Average cotton yield by year, c/ha (2021-2023).

The impact of each treatment on yield was as follows:

Option 1 (Control) showed the lowest yield, with an average of 24.7 centners per hectare, indicating that in saline soils, the absence of organic matter results in low productivity.

Options 2, 3, and 4, which consisted of different combinations of organic and mineral fertilizers, demonstrated significantly higher yields, ranging from 26.5 to 29.4 c/ha compared to the control. These values suggest that these agro-technical measures were moderately effective in improving yield.

In options 5 and 6, the average yield ranged from 27.0 to 27.2 c/ha, which is 2.3–2.5 c/ha higher than the control, showing promising results. This indicates that the organo-mineral composts used in these variants were effective in reducing soil salinity and improving nutrient balance.

Options 7, 8, and 9 recorded the highest yield levels, with average yields ranging from 30.0 to 30.8 c/ha. Notably, Variant 8 stood out with an additional 6.1 c/ha increase over the control. This demonstrates the high efficiency of this compost combination (consisting of manure, glauconite, and licorice processing waste) in improving soil structure, enhancing microbial activity, and creating favorable conditions for plant growth.

The $LSD_{0.05}$ (Least Significant Difference) values presented in the figure for annual yield differences ranged between 1.1 and 1.4 c/ha, with all positive differences exceeding the LSD threshold. This confirms that the yield increases observed in each organo-mineral compost treatment were statistically significant. For example, the 6.1 c/ha increase in Variant 8 compared to the control represents a highly significant difference, making it both scientifically and practically important.

The findings clearly demonstrate that the application of organo-mineral composts is a highly effective approach to increasing agricultural productivity in saline soils. The results of the study show that a well-formulated mixture of organic and mineral fertilizers helps to reduce soil salinity, improve nutrient balance, enhance microbial activity, and optimize the physical and chemical properties of the soil. As a result, plant growth and development improve, leading to a substantial increase in yield.

Moreover, the use of organo-mineral composts not only boosts productivity but also plays a crucial role in ensuring soil sustainability and improving ecological conditions. This, in turn, supports the long-term sustainable development of agricultural production.

CONCLUSION. In the conducted field experiment, the effect of composts with different compositions on cotton yield was studied. When composts prepared in varying quantities were applied, the average yield ranged from 27.0 to 30.8 centners per hectare. The highest yield, including both the immediate and residual effects, was obtained with Compost-4 at a rate of 22 t/ha, resulting in an additional cotton yield of 6.1 centners per hectare compared to the control.

In addition, the use of these composts in combination with a 25% reduced rate of mineral fertilizers also yielded effective results. This indicates their agronomic efficiency and highlights their relevance from both economic and environmental perspectives. The study shows that organo-mineral composts can serve as an important tool for increasing cotton productivity and expanding sustainable cultivation practices in saline-affected soils.

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**ENVIRONMENTAL AND ECONOMIC CHALLENGES OF THE CEMENT
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Abstract: This article examines the key problems of the modern cement industry related to high energy intensity and significant carbon footprint. The necessity of transitioning to resource-saving technologies is substantiated. It has been shown that partial replacement of cement clinker with finely dispersed mineral fillers is a strategically important solution for reducing the environmental burden and product cost.

The cement industry - one of the pillars of the modern construction industry - is also one of the largest sources of anthropogenic impact on the environment. Portland cement production is associated with enormous energy costs and greenhouse gas emissions, which poses serious environmental and economic challenges for the industry. The solution to this situation is the implementation of a sustainable development concept, the key element of which is the modification of cement systems using finely dispersed mineral fillers.

The main problem in the cement industry is a huge carbon footprint. The production of one ton of cement is accompanied by the emission of 0.8-0.9 tons of CO₂. The cement industry accounts for approximately 8% of global anthropogenic carbon dioxide emissions. The main sources of emissions are the decarbonization process of limestone (CaCO₃→CaO+CO₂) and the combustion of fuel for clinker firing. In parallel with environmental problems, there is a depletion of non-renewable natural resources - limestone, clay, gypsum [1]. At the same time, industrial sectors face the problem of utilizing a huge amount of finely dispersed waste (ashes, slag), which is placed in landfills occupied by fertile lands.

The most effective strategy that meets the principles of a "green" economy is to partially replace cement clinker with affordable mineral materials. Such materials can be technogenic wastes (silt ash, microsilica, granulated blast furnace slag) or natural materials (metakaolin, limestone flour). This approach allows achieving a triple positive effect: economic (reducing the cost of construction materials), environmental (reducing CO₂ emissions and utilizing industrial waste), and technical (improving the physical and mechanical properties of cement stone and concrete, including strength, durability, and density) [2].

The modern technology of cement systems has undergone significant evolution, going beyond the traditional component system. Currently, designing cement composite compositions is a complex scientific and technical process aimed at creating multicomponent systems containing two or more functional additives. This transition is due to the need to improve the operational characteristics of concrete, as well as the solution of environmental and economic problems [3].

A promising scientific direction is the integrated use of finely dispersed mineral fillers in cement systems. Composition design technologies have transitioned from mono- to binary, as well as triple and more multi-component systems, which allows achieving a synergistic effect exceeding the sum of individual contributions of each component [4]. Combining two or more fillers with different mechanisms of action allows you to eliminate the shortcomings of each of them and strengthen the positive aspects.

The combined use of finely ground carbonate and other types of active additives can contribute to creating the most favorable conditions for the formation of the necessary complex of properties. For example, the use of limestone provides early strength gain due to the filling effect and acceleration of hydration of the aluminates phases, which is especially important in the first 24 hours. At the same time, the active additive in the form of microsilica enters into an intensive pozzolanic reaction with the formation of secondary C-S-H phases. As a result, high strength and durability are ensured in later hardening periods.

Based on the presented theoretical provisions, the following statement can be put forward as a scientific hypothesis (Figure 1):

The development of highly effective cement composites should be based on the principles of targeted microstructure management, implemented through the combination of finely dispersed mineral fillers with varying surface activity and nature. We assume that the synergistic effect is achieved when using binary or multicomponent systems, where fillers play two complementary roles, according to the postulates of V.I. Salomatov's theory [5] (Fig. 1):

1. Creating crystallization centers and accelerating hydration To accelerate structure formation processes in the early stages of hardening, it is necessary to use fillers whose surface activity is equal to or higher than the binding activity ($F_n \geq F_v$). Particles of such fillers (e.g., microsilica, metacaolin) act as active nucleation centers, intensifying hydration and forming a strong matrix.
2. Structure ordering and deformation reduction: To optimize mechanical characteristics and increase durability in later stages, it is necessary to introduce fillers with surface activity lower than that of the binder ($F_n < F_v$). These particles (e.g., finely ground limestone, crushed sand) contribute to the reduction of inter-particle deformations at the interface, resulting in a more ordered, dense, and stable structure, minimizing the risk of microcrack formation.

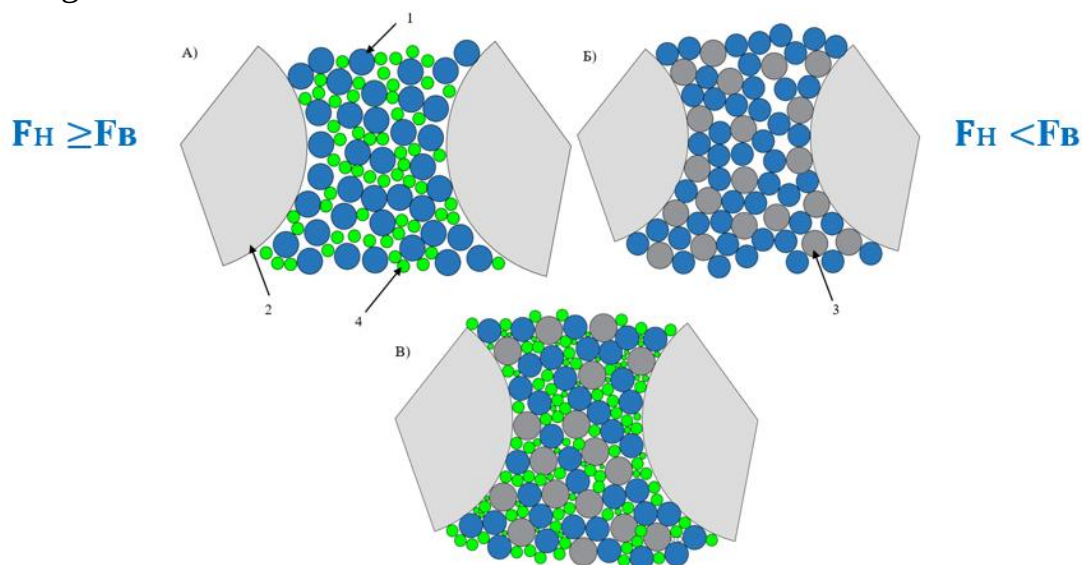


Figure 1. Spatial-structural topology of a binder

A - Dispersity of mineral filler higher than cement dispersity; B - The dispersity of the mineral filler is significantly lower than the dispersity of the cement; B - The dispersity of binary mineral filler is greater than and less than the dispersity of cement (optimal packaging).

Conclusion. Thus, the introduction of binary finely dispersed mineral fillers is not just a technical improvement, but a strategic necessity for the cement industry to transition to sustainable development. The greatest effectiveness is achieved when using binary (two-component) fillers (e.g., a combination of microsilica and limestone flour), which provide a synergistic effect:

1. Microstructure optimization: The combination of particles of different dispersity contributes to the multi-scale compaction of cement stone.

2. Reduce porosity: Effective filling of the intergranular space leads to a sharp decrease in permeability and total porosity.
3. Improving durability: The compacted structure achieved through binary fillers ensures increased strength and durability of the material.
4. Economic: Reducing the cost of construction materials by replacing expensive clinker with cheaper fillers.
5. Ecological: Reducing CO₂ emissions by reducing clinker production volumes and utilizing industrial waste.
6. Technical: Improving the physical and mechanical properties of cement stone and concrete (strength, durability, density).

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XORAZM VILOYATIDA MAVJUD MAHALLIY SABZAVOT VA MEVALARNING GEPATOPROTEKTIV XUSUSIYATLARI

Omonova Dilnura Ulug‘bek qizi
Xo‘janiyazova Dildora Zokirovna
Qurbonova Nilufar Po‘latovna

Toshkent tibbiyot akademiyasi Urganch filiali

Tadqiqotning dolzarbligi. So‘nggi yillarda surunkali jigar kasalliklari, xususan gepatit va yog‘li gepatoz bilan og‘rigan bemorlar soni ortib bormoqda. Dori vositalarining uzoq muddat qo‘llanilishi ko‘pincha yon ta’sirlarni keltirib chiqarishi sababli, xavfsiz va samarali tabiiy muqobillarga ehtiyoj ortmoqda. Shu nuqtai nazardan, Xorazm viloyatida keng tarqalgan va biologik faol moddalarga boy bo‘lgan mahalliy sabzavot va mevalarning gepatoprotektiv xususiyatlarini o‘rganish jigar kasalliklarini oldini olish va kompleks davolashda katta ilmiy-amaliy ahamiyatga ega.

Tadqiqotning maqsadi Xorazm viloyatida keng tarqalgan mahalliy sabzavot va mevalarning tarkibidagi biologik faol moddalarning gepatoprotektiv xususiyatlarini aniqlash hamda ularni surunkali jigar kasalliklari bo‘lgan bemorlarning dietoterapiyasiga qo‘shish samaradorligini baholashdan iborat.

Materiallar va usullar. Tadqiqot Xorazm viloyatida yetishtiriladigan qovun, tarvuz, anor, sabzi, qovoq va uzum mahsulotlari asosida olib borildi. Ularning tarkibidagi karotinoidlar, polifenollar, flavonoidlar, C va E vitaminlari spektrofotometr usuli yordamida aniqlandi. Klinik kuzatuvga 42 nafar surunkali gepatit tashxisi qo‘yilgan bemor jalb qilinib, 8 hafta davomida dietaga ushbu mahsulotlar qo‘shib berildi. Jigar funksiyasi ALT, AST va bilirubin darajalari orqali baholandi.

Natijalar. Tadqiqot davomida Xorazm viloyatida keng yetishtiriladigan sabzavot va mevalarning tarkibida biologik faol moddalarning yuqori darajada mavjudligi aniqlandi. Jumladan, sabzi va qovoqda beta-karotin, anor va uzumda polifenollar, qovun va tarvuzda esa likopin moddasi ko‘p miqdorda qayd etildi. Bu moddalar antioksidant faollik ko‘rsatib, jigar hujayralarini oksidlanish stressidan himoya qilish xususiyatiga ega ekanligi kuzatildi. Klinik kuzatuvlarda ushbu mahsulotlarni dietoterapiyaga qo‘shgan asosiy guruh bemorlarida 8 hafta davomida ALT darajasi 18,6% ga, AST darajasi 15,4% ga, bilirubin esa 12,3% ga kamaygani qayd etildi ($p < 0,05$). Subyektiv ko‘rsatkichlarda esa umumiy holat yaxshilanishi, charchoq va psixoemotsional zo‘riqish darajasining kamayishi aniqlandi. Nazorat guruhida esa statistik ahamiyatli o‘zgarishlar qayd etilmadi.

Xulosa. O'tkazilgan tadqiqotlar shuni ko'rsatdiki, Xorazm viloyatida keng yetishtiriladigan sabzavot va mevalar tarkibida biologik faol moddalar (beta-karotin, polifenollar, likopin va boshqalar) yuqori darajada mavjud bo'lib, ular tabiiy gepatoprotektorlik xususiyatiga ega. Ushbu mahsulotlarni dietoterapiyaga qo'shish jigar funksional ko'rsatkichlarini yaxshilash, oksidlanish stressini kamaytirish va bemorlarning umumiy holatini barqarorlashtirishda samarali ekanligi aniqlandi. Shunday qilib, mahalliy sabzavot va mevalardan kompleks davolash jarayonida foydalanish surunkali jigar kasalliklari profilaktikasi va davosida ilmiy-amaliy jihatdan maqsadga muvofiqdir.

Adabiyotlar ro'yxati.

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TIL TA'LIMIDA MULTIMEDIA IMKONIYATLARI

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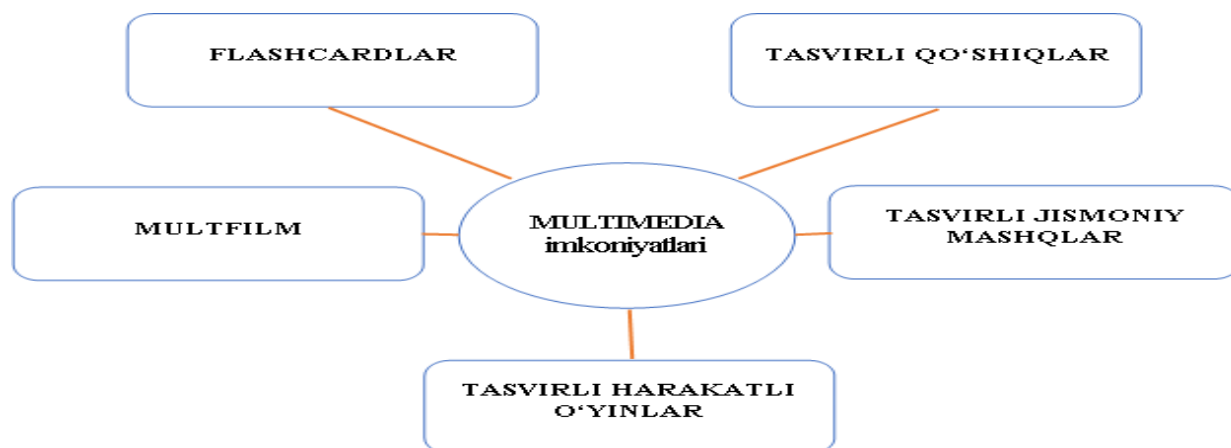
ANNOTASIYA

Hozirgi vaqtda axborot texnologiyalari axborotning asosiy manbalaridan biri bo'lib, darsliklardan farqli o'laroq, interfaollik, multimedialilik darajasi nihoyatda yuqori bo'lib, o'quvchilarda katta qiziqish uyg'otadigan va o'quv materiallarini muvaffaqiyatli egallashga hissa qo'shadigan vosita hisoblanadi.

Kalit so'zlar. Til o'rgatish imkoniyatlari, maktabgacha ta'lim, so'z boyligi, nutq madaniyati, grafika, animatsiya.

Multimedia lotincha *multi* - ko'p, *media* – axborot tashuvchi, vositachi, ma'nolarini anglatadi. Kompyuterning matn, grafika, tovushli va videoma'lumotlar bilan ishlashga imkon beruvchi qurilma. Bugungi kunda ta'lim jarayonida kommunikativ axborot vositalari, xususan, multimedia resurslaridan foydalanish zaruriy ehtiyojga aylandi. Multimedia - bu zamonaviy texnik va dasturiy vositalardan foydalanib, interfaol dasturiy ta'minot ostida boshqariladigan video va audio effektlarning o'zaro bog'liqligi bo'lib, matn, tovush, grafika, tasvir, videoni birlashtiradi. Bunda ma'lumot turli axborot tashuvchilarida (magnit va optik disklar, audio va video tasmlar) mavjud bo'lishi mumkin. Multimedia tushunchasi mutaxassislar tomonidan turlicha ta'riflanadi. Jumladan, U.Xodjayev ta'rificha, multimedia (*multimedia* - ko'p muhitlilik) vositalari bu texnik va dasturlar to'plami bo'lib, u insonga o'zi uchun tabiiy bo'lgan juda turli-tuman muhitlarni: tovush, video, grafika, matnlar, animatsiyalarni ishlatgan holda zamonaviy texnologiya vositasida, biror axborotni insonga odatdagidan ko'ra ko'proq olish imkonini beradi. G.Sobirova fikricha esa, multimedia (*multi* - ko'p, *media* - muhit) - bu kompyuter texnologiyalarining sohasi bo'lib, turli axborot saqlovchi vositalaridagi turli fizik ko'rinishda ifodalangan axborotlarga ishlov beradi. Multimedia AKT ning tarkibiy qismlaridan biri bo'lib, bugungi kunda maktabgacha yoshdagi bolalarga mashg'ulotlar o'tish, til o'rgatish faoliyati jarayonida keng foydalanib kelinmoqda. Mutaxassislar ta'kidicha, agar bolalar berilayotgan materiallarni ko'rish (video) asosida qabul qilsa, axborotni xotirada saqlab qolishi 25-30 % ga oshadi. Bunga qo'shimcha sifatida o'quv materiallari audio, video va grafika ko'rinishida mujassamlashgan holda berilsa, materiallarni xotirada saqlab borish 75 %

ga ortadi. Multimedia vositasi imkoniyatlari orqali bolalar tillarni samarali o'zlashtiradilar (2.3.2-rasmga qarang):



2.3.2-rasm. Multimedia vositalari orqali MTlarda til o'rgatish va bilingvallikni shakllantirish imkoniyatlari

Yuqorida qayd etilganidek, maktabgacha yoshda yangi bilimlarni o'zlashtirishda bolalar uchun ko'rgazmali vositalar juda muhim ahamiyat kasb etadi. Keyingi yillarda ko'rgazmali vositalar safiga multimedia vositalari ham qo'shildi. Agar katta yoshdagi kishilar yangi so'zlarni og'zaki tarjima va tushuntirish vositasida, so'zlar assotsiatsiyalari, obrazlar va ko'rgazmali rasmlar asosida birdek o'zlashtirsalar, bolalar uchun vaziyatning ko'rgazmaliligi, ya'ni real ob'ektlar eng muhim vosita. Multimedia vositasida bolalar lug'at boyligining sekin-asta o'sib borishi natijasida uning rivojlanishi va ichki leksikasi darajasidagi aloqalari ancha yuqoriroq darajaga ko'tariladi.

Tillarning ta'limi faoliyati jarayonida bolalar va kichik yoshdagi o'quvchilarning lug'at boyligini va nutq madaniyatini o'stirishda audio va video vositalar, multimedilardan foydalanishning ham ta'limiy, ham tarbiyaviy samarasi katta. Xususan, xorijiy tillarni o'rgatish va o'rganishda texnika vositalari ma'lumotlarini kengaytirish uchun qo'shimcha resurslar va vositalarni taqdim etadi, eng muhimi, barcha o'quvchilarni birdek jalb eta oladi.

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PREDICTIVE ROLE OF BIOMARKERS AND ANTIOXIDANT THERAPY IN ACUTE PANCREATITIS: RESULTS OF A CLINICAL STUDY

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The study evaluates the diagnostic and prognostic value of inflammatory biomarkers and the therapeutic potential of antioxidant therapy in patients with acute pancreatitis (AP). The goal was to improve early disease stratification and reduce the frequency of complications through biomarker-based clinical assessment. Despite advances in intensive care, acute pancreatitis continues to have a high mortality rate (up to 30% in severe cases). Early prediction of severe forms remains challenging. Biomarkers such as interleukin-6 (IL-6), procalcitonin (PCT), and cystatin-C have been proposed as early predictors of systemic inflammatory response and multi-organ failure. Integrating these parameters into clinical algorithms may help optimize treatment strategies and improve prognosis.

Materials and Methods. The study included 74 patients with acute pancreatitis aged 27–69 years (mean age 48.2 ± 3.6). Serum levels of CRP, IL-6, PCT, cystatin-C, and total antioxidant capacity were analyzed within 48 hours of admission. Severity was assessed using BISAP and Ranson scales. Thirty-two patients received additional antioxidant therapy (vitamin C 1 g/day + α -tocopherol 400 mg/day) and early enteral nutrition enriched with glutamine and omega-3 fatty acids.

Results. Severe AP was diagnosed in 21 patients (28.4%). IL-6 and PCT levels within 24 hours of admission were significantly higher in the severe group (IL-6: 94.6 ± 8.3 pg/ml vs. 32.1 ± 4.5 pg/ml; PCT: 3.2 ± 0.6 ng/ml vs. 0.8 ± 0.2 ng/ml; $p < 0.001$). The correlation between IL-6 levels and BISAP scores was $r = 0.71$ ($p < 0.01$). Elevated cystatin-C was associated with renal dysfunction and prolonged hospitalization. Patients receiving antioxidant therapy demonstrated a 1.6-fold faster reduction in CRP levels and a 37% lower incidence of necrotic complications compared to the control group. The average hospital stay was reduced from 14.2 ± 2.1 to 9.3 ± 1.8 days ($p < 0.01$).

Discussion. The obtained data confirm the predictive value of IL-6 and procalcitonin in the early diagnosis of severe AP. The use of antioxidant therapy and early enteral nutrition improves redox balance, reduces systemic inflammation, and accelerates recovery. This supports the inclusion of antioxidant support as an essential component of comprehensive treatment in AP patients.

Conclusions. IL-6, procalcitonin, and cystatin-C are reliable early biomarkers for predicting the severity of acute pancreatitis. Antioxidant therapy combined with early

enteral nutrition reduces the duration of hospital stay and the frequency of systemic complications. The integration of biomarker monitoring into clinical protocols enhances treatment personalization and overall outcomes in pancreatitis management.

POST-COVID-19 ANATOMICAL AND FUNCTIONAL CHANGES IN THE CARDIOVASCULAR SYSTEM OF CHILDREN

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Research Aim:

The primary aim of this study is to investigate the anatomical and functional alterations in the cardiovascular system of children following recovery from COVID-19 infection. The research seeks to identify subclinical myocardial injury, endothelial dysfunction, and autonomic imbalance that may develop as post-infectious sequelae. By comparing echocardiographic, electrocardiographic, and biochemical parameters between post-COVID-19 pediatric patients and healthy controls, the study aims to determine the extent and persistence of cardiovascular impairment. Furthermore, the study intends to establish correlations between laboratory markers of inflammation and cardiac function indices in order to elucidate potential mechanisms of myocardial and vascular damage.

Materials and Methods

This observational comparative study was conducted at the Department of Pediatric Cardiology, [Name of Institution], between January 2023 and June 2025. The study included 84 children aged 5 to 16 years who had recovered from laboratory-confirmed COVID-19 infection at least eight weeks prior to evaluation. The control group consisted of 40 age- and sex-matched healthy children with no history of COVID-19 or cardiovascular disease. Each participant underwent a comprehensive clinical evaluation, including medical history, physical examination, and assessment of symptoms such as fatigue, chest discomfort, or palpitations. Echocardiography was performed using a Philips EPIQ 7C ultrasound system to assess left ventricular ejection fraction (LVEF), myocardial performance index (MPI), diastolic function (E/A ratio), and wall thickness. Electrocardiography (ECG) was carried out to evaluate heart rhythm, conduction abnormalities, and heart rate variability. In addition, laboratory analyses included measurements of C-reactive protein (CRP), troponin I, D-dimer, and B-type natriuretic peptide (BNP) to assess inflammatory and myocardial stress markers. Data were statistically analyzed using SPSS version 25.0. Continuous variables were expressed as mean $\pm$ standard deviation (SD), and categorical variables as percentages.

Results

A total of 84 post-COVID-19 children (mean age: 10.8 ± 2.9 years; 46 boys and 38 girls) and 40 healthy controls (mean age: 10.6 ± 3.1 years) were examined. No significant differences in baseline age, sex, or body mass index were observed between the groups ($p > 0.05$). Clinical evaluation revealed that 41.6% of post-COVID-19 children reported fatigue, 28.5% experienced mild chest pain, and 23.8% complained of palpitations. Reduced exercise tolerance was noted in 11.9% of cases, while no severe heart failure symptoms were found. Echocardiographic analysis showed a decrease in left ventricular ejection fraction (LVEF) ($59.2 \pm 4.8\%$ vs. $63.5 \pm 3.6\%$, $p < 0.01$) and fractional shortening (FS) ($28.6 \pm 2.3\%$ vs. $32.1 \pm 2.8\%$, $p < 0.01$). The myocardial performance index (MPI) was higher in post-COVID children (0.46 ± 0.07 vs. 0.39 ± 0.05 , $p < 0.05$), indicating mild ventricular dysfunction. ECG findings revealed a reduction in heart rate variability (HRV) ($p < 0.05$) and isolated premature atrial contractions in 8.3% of cases. Laboratory results showed elevated levels of CRP (6.3 ± 2.1 mg/L), troponin I (0.035 ± 0.01 ng/mL), and BNP (64.5 ± 18.9 pg/mL) compared to controls ($p < 0.05$).

Overall, the findings indicate that post-COVID-19 children may develop subclinical myocarditis, endothelial dysfunction, and mild cardiac performance impairment, even in the absence of overt symptoms.

Conclusion

The results of this study demonstrate that children recovering from COVID-19 infection may develop subtle but clinically significant cardiovascular changes, including decreased myocardial contractility, endothelial dysfunction, and autonomic imbalance. These alterations can persist for weeks or months after recovery, even in cases of mild or asymptomatic infection. Early echocardiographic and laboratory screening is essential for identifying subclinical cardiac involvement. Continuous monitoring and timely rehabilitation are recommended to prevent long-term cardiovascular complications and ensure full recovery in the pediatric population.

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AN INNOVATIVE METHODOLOGY FOR EVALUATING AND ASSESSING B1-LEVEL STUDENTS' READING SKILLS IN ENGLISH LESSONS THROUGH MOBILE APPLICATIONS

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Annotation

The integration of digital technologies in foreign language teaching has led to significant innovations in evaluation and assessment methodologies. This paper examines how mobile applications can be effectively used to evaluate and assess the reading skills of B1-level learners in English lessons. The study focuses on formative and summative assessment strategies within a mobile-assisted language learning (MALL) framework. The paper also explores how adaptive reading platforms and mobile testing tools contribute to individualized feedback, motivation, and data-driven evaluation. Findings suggest that mobile-based assessment supports continuous learning, fosters learner autonomy, and enhances the validity of reading skill evaluation in English language teaching.

Keywords: assessment, evaluation, reading skills, B1 level, mobile learning, MALL, English language teaching

Introduction

In modern English language education, the assessment of reading skills has moved beyond traditional paper-based testing toward more dynamic and technology-integrated approaches. The growing availability of mobile devices and digital platforms offers new possibilities for monitoring and improving reading comprehension. Mobile-assisted language learning (MALL) provides teachers and learners with innovative methods to practice, assess, and analyze reading performance in flexible, interactive environments (Kukulska-Hulme & Shield, 2020). At the B1 (intermediate) level, learners are expected to understand main ideas, locate specific information, and infer meaning from moderately complex texts. However, assessing these skills through traditional exams often fails to capture real-time comprehension processes or provide personalized feedback. Mobile applications, such as ReadTheory, British Council Learn English, Duolingo English Test, and LingQ, can fill this gap by offering adaptive reading exercises and immediate evaluation mechanisms that track progress automatically (Lin & Yu, 2021). This paper presents a methodological approach for evaluating and assessing reading skills at the B1 level using mobile

technologies. It aims to propose practical, evidence-based tools and techniques that English language teachers in Uzbekistan and similar contexts can apply in their classrooms.

Literature Review

Assessment plays a central role in the language learning process. According to Brown and Abeywickrama (2019), assessment serves not only to measure learners' performance but also to promote learning through feedback and reflection. With the advancement of digital learning tools, evaluation has become more formative, continuous, and interactive.

In MALL contexts, reading assessments can be embedded within mobile learning applications. These platforms automatically adjust the difficulty of texts and questions based on the learner's performance, creating an adaptive learning environment (Burston, 2015). Mobile-based tests can assess a range of subskills, including skimming, scanning, vocabulary recognition, and inference-making. Additionally, gamified features such as progress bars, points, and achievements encourage learner motivation (Deterding, 2021). Research by Alamer and Alrishan (2022) indicates that students assessed through mobile applications show higher motivation and retention rates than those using traditional testing methods. Similarly, Chen and Li (2020) found that mobile-based reading evaluations provide more immediate and personalized feedback, allowing teachers to track progress efficiently.

Proposed Methodology

The proposed methodology follows a formative–summative hybrid approach. It combines continuous, in-app feedback (formative assessment) with periodic evaluations (summative assessment) aligned with CEFR B1 descriptors. The framework is based on three principles: authenticity, adaptivity, and feedback orientation. Assessment Tools include ReadTheory, BBC Learning English, Duolingo English Test, and Google Forms quizzes. The procedure involves pre-assessment diagnostics, weekly formative tasks, a final mobile-based test, and reflective feedback. Evaluation Criteria focus on accuracy, reading speed, vocabulary range, inference skills, and consistency across time. Data collected through mobile apps generate detailed performance reports for both teachers and students, enabling data-driven assessment and continuous improvement.

The methodology demonstrates that mobile-assisted assessment enhances engagement and reliability in evaluating reading skills. Continuous data collection allows teachers to identify learners' weak areas and adapt instruction accordingly. Real-time feedback encourages self-regulated learning and promotes autonomy

(Nation, 2013). Challenges include technical access issues, distractions, and content validity. Teachers must ensure alignment with CEFR objectives and provide digital literacy support to all learners.

Conclusion

Mobile applications offer effective tools for assessing reading skills among B1-level English learners. By integrating formative and summative assessments within mobile environments, teachers can ensure continuous progress tracking and meaningful feedback. This methodology aligns with Uzbekistan's educational modernization goals, emphasizing digital literacy and communicative competence.

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Katarakda

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Annotatsiya: Katarakta (lotincha: cataracta) - ko'z gavharining xiralashishi natijasida ko'rish qobiliyatining pasayishi bilan xarakterlanadigan kasallik. Gavhar normal holatda tiniq bo'lishi kerak, shunda yorug'lik bemaol o'tib, to'r pardaga fokuslana oladi. Katarakta rivojlanganda gavhar xiralashadi, natijada ko'rish qobiliyati pasayadi, xuddi oynadan loyqa oynadan qaragandek bo'ladi. Sabablari: Kataraktaning asosiy sababi yoshga bog'liq o'zgarishlar hisoblanadi, lekin boshqa omillar ham rol o'ynashi mumkin: Qandli diabet, ko'z jarohatlari, uzoq muddat davomida kortikosteroidlar kabi dorilarni qabul qilish, uzoq muddat davomida ultrabinafsha nurlanish ta'sirida bo'lish, irsiy moyillik.

Kalit so'zlar: Katarakta (Cataract), ko'z kasalliklari (Eye diseases), gavhar (Lens), ko'rish (Vision), xiralashish (Opacity), ko'rishning pasayishi (Vision loss), ko'z jarrohligi (Eye surgery), oftalmologiya (Ophthalmology).

Kirish: "Ko'z – insoniyatga berilgan bebaho ne'mat. U orqali biz dunyoni barcha go'zalliklari bilan ko'ra olamiz. Ammo afsuski, ko'z ham turli kasalliklarga duchor bo'lishi mumkin. Ulardan biri - katarakta. Katarakta – bu ko'z gavharining xiralashishi bo'lib, ko'rish qobiliyatining pasayishiga olib keladi. Xuddi loyqa oynadan dunyoga qaragandek bo'ladi. Katarakta yillar davomida sekin-asta rivojlanishi mumkin, shuning uchun ko'pchilik dastlabki bosqichlarda bu o'zgarishlarni sezmaydi. Biroq, vaqt o'tishi bilan bu kasallik kundalik hayotga jiddiy ta'sir ko'rsatishi mumkin.

Tadqiqot material: Kataraktaning ta'rifi: ko'z gavharining xiralashishi, kataraktaning turlari: yoshga bog'liq katarakta (eng ko'p tarqalgani), kongenital katarakta (tug'ma), ikkilamchi katarakta (boshqa kasalliklar yoki dorilar natijasida) travmatik katarakta (jarohat natijasida), radiatsion katarakta (radiatsiya ta'sirida). Gavhar tuzilishi va funksiyasi, kataraktaning shakllanish mexanizmlari: oqsil agregatsiyasi, oksidlanish stressi, metabolik buzilishlar, ion muvozanatining buzilishi, Genetik omillar: Ba'zi genlarning katarakta rivojlanishdagi roli.

Tadqiqot maqsadi: Kataraktaning sabablari, rivojlanish mexanizmlari, diagnostikasi, davolash usullari va oldini olish yo'llarini chuqurroq o'rganish orqali ko'rish qobiliyatini yaxshilash va bemorlarning hayot sifatini oshirish.

Etiologiya va Patogenez:

- Kataraktaning shakllanishida ishtirok etadigan genetik va atrof-muhit omillarini aniqlash.
- Oksidlanish stressi, yallig'lanish va metabolik buzilishlarning rolini o'rganish.
- Gavhar oqsillarining agregatsiyasi mexanizmlarini o'rganish.
- TGF-beta, Wnt signalizatsiya yo'llari kabi katarakta rivojlanishiga ta'sir etuvchi molekulyar mexanizmlarni aniqlash. Katarakta jarrohligining natijalarini yaxshilash uchun yangi jarrohlik texnikalari va asboblarni ishlab chiqish.
- IOL (intraokulyar linza) dizaynini takomillashtirish, ko'rish sifatini yaxshilash va asorotlar xavfini kamaytirish.
- Ikkilamchi kataraktaning oldini olish uchun yangi strategiyalarni ishlab chiqish.
- Kataraktani dori-darmon bilan davolash imkoniyatlarini o'rganish (masalan, antioksidantlar, chaperonlar, alkilasyon inhibitorlari).

Xulosa: Kelajakdagi tadqiqotlar kataraktaning rivojlanish mexanizmlarini chuqurroq o'rganish, diagnostika usullarini takomillashtirish va dori-darmonlar yordamida davolash imkoniyatlarini yaratishga qaratilishi kerak. Profilaktika choralari, masalan, quyoshdan himoya qilish, chekishni tashlash va sog'lom hayot tarzini qo'llab-quvvatlash ham kasallikning rivojlanish xavfini kamaytirishga yordam beradi. Katarakta tug'ma va hayotda orttirilgan bo'ladi. Ona qornida rivojlanayotgan homilaga turli tashqi (zaharlanish, gipova avitaminoz, nurlanish) va ichki (ona va bolaning rezus kelishmovchiligi) muhitlarning salbiy ta'siri, homiladorlik vaqtida onaning turli kasalliklar, ayniqsa, yuqumli kasalliklar bilan og'rishi, shuningdek, nasldannasga o'tuvchi irsiy kasalliklar tug'ma kataraktaga sabab bo'ladi. Bunda gavharning xiralashishi juda sekin rivojlanishi mumkin, ayrim bemorlarda umr bo'yi o'zgarmaydi. Xulosa qilib aytganda, katarakta - bu davolanishi mumkin bo'lgan kasallik bo'lib, erta tashxis va samarali davolash ko'rish qobiliyatini tiklash va bemorlarning hayot sifatini yaxshilash uchun juda muhimdir.

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SOTSIALINGVISTIK KOMPETENTLIKNI RIVOJLANTIRISHDA MADANIYATLARARO MULOQOT TOPSHIRIQLARINING AHAMIYATI

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Annotatsiya:

Ushbu tezisda bo'lajak ingliz tili o'qituvchilarida sotsiolingvistik kompetentlikni rivojlantirish jarayonida madaniyatlararo muloqot topshiriqlarining o'rni va ahamiyati yoritiladi. Tadqiqot natijalari madaniy kontekstda o'qitish sotsiolingvistik kompetentlikning shakllanishiga samarali ta'sir ko'rsatishini ko'rsatadi.

Kalit so'zlar: Sotsiolingvistik kompetentlik, madaniyatlararo muloqot, bo'lajak ingliz tili o'qituvchisi, kommunikativ kompetentlik, madaniyatlararo topshiriqlar, til va madaniyat uyg'unligi, interkultural yondashuv, til kompetensiyasi, nutq etiketi, globallashuv, til o'rgatishda madaniy kontekst, muloqot kompetensiyasi, o'qituvchining pedagogik roli, reflektiv ta'lim, lingvokulturologiya.

Kirish: Bugungi globallashuv davrida ingliz tili nafaqat muloqot vositasi, balki madaniyatlararo aloqaning asosiy kalitidir. Bo'lajak ingliz tili o'qituvchisi nafaqat grammatik va leksik bilimlarga, balki sotsiolingvistik kompetentlikka ham ega bo'lishi zarur. Bu kompetentlik orqali o'qituvchi turli madaniyat vakillari bilan to'g'ri muloqot o'rnatish, mos uslubni tanlash va ijtimoiy kontekstni to'g'ri anglash qobiliyatiga ega bo'ladi. Bugungi kunda shaxsning sotsiolingvistik kompetentligini rivojlantirish chet tili ta'limining ajralmas tarkibiy qismiga aylangan. Chunki til faqat grammatik tizim emas, balki ma'lum bir xalqning madaniy qadriyatlari, urf-odatlar, milliy tafakkuri va ijtimoiy muhitining ifodasidir. Shu boisdan, chet tilini o'rganish jarayonida o'quvchilar nafaqat so'z va grammatik tuzilmalarni, balki o'sha til egalari qanday fikrlashi, o'zaro qanday muloqot qilishi, turli ijtimoiy vaziyatlarda qanday nutqiy strategiyalardan foydalanishini ham o'rganishlari zarur. Madaniyatlararo muloqot topshiriqlari aynan shu jarayonda muhim o'rin tutadi. Bunday topshiriqlar o'quvchilarda boshqa millat vakillariga nisbatan hurmat, bag'rikenglik, ochiq fikrlilikni shakllantiradi, ular orqali

real kommunikativ vaziyatlarda to'g'ri nutqiy xulq-atvorni qo'llashga o'rgatadi. Shuningdek, sotsiolingvistik kompetentlikni rivojlantirishda madaniyatlararo muloqot topshiriqlari til o'rganish jarayonini yanada qiziqarli, amaliy va samarali qiladi. Mazkur tadqiqot mavzusining dolzarbligi shundaki, zamonaviy ta'limda kommunikativ yondashuv ustuvor ahamiyat kasb etmoqda va bu jarayonda sotsiolingvistik hamda madaniyatlararo kompetensiyalarni uyg'un rivojlantirish ta'lim sifatini oshirishda muhim omil bo'lib xizmat qiladi. Shunday ekan, sotsiolingvistik kompetentlikni madaniyatlararo muloqot topshiriqlari orqali shakllantirish masalasi nazariy va amaliy jihatdan chuqur o'rganishni talab etadi.

Asosiy qism:

Sotsiolingvistik kompetentlik — bu til foydalanuvchisining ma'lum ijtimoiy sesharoidda tildan to'g'ri foydalanish ko'nikmasidir. Ingliz tili o'qituvchilarini tayyorlashda madaniyatlararo muloqot topshiriqlaridan foydalanish bu kompetentlikni rivojlantirishning eng samarali yo'llaridan biridir.

Bunday topshiriqlarga quyidagilar kiradi:

Rol o'yinlari: turli madaniyat vakillari o'rtasidagi muloqotni simulyatsiya qilish (masalan, talaba va xorijlik sayyoh o'rtasidagi suhbat).

Dialog tahlili: ingliz tilida muloqot qiluvchi madaniyatlar o'rtasidagi sotsiolingvistik farqlarni muhokama qilish.

Video kuzatuv topshiriqlari: turli mamlakatlarda muloqot odobini tahlil qilish. Mazkur topshiriqlar yordamida o'quvchilar real hayotdagi muloqot vaziyatlarini anglab, turli ijtimoiy kontekstlarda so'zlashishning to'g'ri usullarini o'rganadilar. Bu esa ularning professional tayyorgarligini oshiradi va ingliz tili o'qituvchisi sifatida madaniyatlararo muhitda samarali faoliyat yuritishiga yordam beradi. Sotsiolingvistik kompetentlik — bu shaxsning ijtimoiy vaziyatga mos ravishda til birliklarini tanlash, nutq uslubini to'g'ri belgilash, muloqotdagi ijtimoiy rollarni aniqlash va ularni madaniy jihatdan mos tarzda ifoda etish qobiliyatidir.

U Canale va Swain (1980) tomonidan kommunikativ kompetentlikning muhim tarkibiy qismi sifatida belgilangan. Sotsiolingvistik kompetentlik quyidagi ko'nikmalarni o'z ichiga oladi: muloqotda ijtimoiy maqomga mos til birliklarini tanlash; madaniyatga xos nutq shakllarini tushunish; odob-axloq me'yorlariga rioya qilish; nutq kontekstini to'g'ri talqin qilish.

Madaniyatlararo muloqotning ta'limdagi o'rni — bu turli millat va madaniyat vakillari o'rtasida o'zaro tushunishni ta'minlovchi jarayondir. Ingliz tili o'qituvchisi uchun bu jarayon alohida ahamiyatga ega, chunki u faqat til emas, balki madaniyat ko'prigi hamdir. Ingliz tili darslarida madaniyatlararo muloqotni o'rgatish o'quvchilarni global fuqarolik, tolerantlik va empatiya ruhida tarbiyalaydi.

Madaniyatlararo topshiriqlarning turlari: Sotsiolingvistik kompetentlikni rivojlantirishda quyidagi turdagi topshiriqlar ayniqsa samarali hisoblanadi: Talabalar turli madaniyat vakillari o'rtasidagi muloqotni tasvirlaydi, masalan: "sayyoh va mahalliy odam", "o'qituvchi va xorijiy talaba" kabi vaziyatlar. Dialog tahlili (Discourse analysis) Talabalarga ingliz tilida yozilgan yoki aytilgan real dialoglar beriladi. Ular muloqot uslublari, nutq etiketi, ijtimoiy masofani tahlil qiladilar.

Kino va video tahlil Madaniyatlararo vaziyatlarni aks ettiruvchi filmlar yoki videolardan so'ng muloqot uslublarini tahlil qilish o'quvchilarga kontekstni his qilish imkonini beradi. Virtual muloqot (Online exchange). Xorijiy talabalar bilan onlayn suhbatlar (telecollaboration) orqali haqiqiy madaniy muloqot tajribasini yaratish.

Pedagogik yondashuvlar Madaniyatlararo muloqot topshiriqlarini qo'llashda quyidagi yondashuvlar samarali: Kommunikativ yondashuv (Communicative approach) – asosiy e'tibor muloqotga qaratiladi. Task-based learning (TBL) – real hayotdagi vazifalar asosida o'qitish. Content and Language Integrated Learning (CLIL) – fan va tilni birgalikda o'qitish. Reflective learning – talabalarni o'z nutqi va madaniy xulqini tahlil qilishga o'rgatish.

O'qituvchi roli Vositachi, yo'l-yo'riq ko'rsatuvchi va madaniyatlararo aloqa targ'ibotchisi sifatida ishtirok etadi. O'qituvchining o'zi madaniyatlararo farqlarni chuqur tushungan taqdirdagina o'quvchilarni to'g'ri yo'naltira oladi.

Sotsiolingvistik kompetentlik — bu shaxsning ijtimoiy vaziyatga mos ravishda til birliklarini tanlash, nutq uslubini to'g'ri belgilash, muloqotdagi ijtimoiy rollarni aniqlash va ularni madaniy jihatdan mos tarzda ifoda etish qobiliyatidir.

U Canale va Swain (1980) tomonidan kommunikativ kompetentlikning muhim tarkibiy qismi sifatida belgilangan. Sotsiolingvistik kompetentlik quyidagi ko'nikmalarni o'z ichiga oladi: muloqotda ijtimoiy maqomga mos til birliklarini tanlash; madaniyatga xos nutq shakllarini tushunish; odob-axloq me'yorlariga rioya qilish; nutq kontekstini to'g'ri talqin qilingan. Madaniyatlararo muloqot – turli xalqlar madaniyatlari, qadriyatlari va nutq odoblari asosida o'zaro tushunishni ta'minlovchi jarayondir.

Til o'qitish jarayonida interkultural yondashuv qo'llanilganda, o'quvchi nafaqat tilni, balki uning ortidagi madaniyatni ham o'rganadi. Bu yondashuv orqali: o'quvchilar madaniyatlararo tolerantlikni shakllantiradi; til va madaniyat uyg'unligini tushunadi; turli vaziyatlarda mos nutq etiketini qo'llay oladi.

Madaniyatlararo topshiriqlarning ahamiyati. Til o'rganishda madaniyatlararo topshiriqlar — bu o'quvchini haqiqiy muloqot sharoitiga yaqinlashtiruvchi faol metodlardan biridir. Misollar: Rol o'yinlari: "Restoranda buyurtma berish", "Ish suhbatida ishtirok etish", "Chet el mehmonini kutib olish". Madaniy taqqoslash: . . . O'zbek va ingliz xalqining salomlashish, sovg'a berish yoki mehmondo'stlik

an'analari solishtirish. Autentik materiallar bilan ishlash: ingliz tilidagi filmlar, reklamalar, qo'shiqlar yoki maqolalarni tahlil qilish. Bunday topshiriqlar o'quvchining muloqot kompetensiyasini kuchaytiradi, madaniy kontekstni anglashni osonlashtiradi va refleksiv ta'lim tamoyillariga asoslanadi. Bo'lajak ingliz tili o'qituvchisining roli: Bo'lajak ingliz tili o'qituvchisi pedagogik va sotsiolingvistik vositachi sifatida faoliyat yuritadi. U o'quvchini turli madaniyatlar o'rtasida o'zini erkin tutish, tushunish va hurmat qilishga o'rgatadi. Shuningdek, o'qituvchi: dars jarayonida lingvokulturologiya elementlarini qo'llaydi; refleksiv ta'lim orqali o'quvchini o'z xatti-harakatlarini tahlil qilishga undaydi; har bir til birligi ortidagi madaniy ma'noni tushuntiradi. Globallashtirish davrida til o'qitishda madaniy kontekstning roli.

Globallashtirish sharoitida ingliz tili o'qitishning asosiy maqsadi — o'quvchini xalqaro muloqotga tayyorlashdir. Buning uchun har bir darsda madaniy kontekst kiritilishi zarur.

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СОВЕРШЕНСТВОВАНИЕ МОДЕЛИ ЭКОНОМИЧЕСКОГО РОСТА ДЛЯ ОБЕСПЕЧЕНИЯ ИНКЛЮЗИВНОГО РАЗВИТИЯ В РЕГИОНЕ

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Аннотация: Статья посвящена анализу современных подходов к совершенствованию модели экономического роста с целью обеспечения инклюзивного развития региона. Рассматриваются теоретические основы инклюзивного развития, механизмы его реализации и практические инструменты для достижения устойчивого и справедливого экономического роста. Предложена комплексная модель инклюзивного развития, адаптированная к специфике развивающихся регионов.

Ключевые слова: инклюзивное развитие, экономический рост, региональное развитие, социальная справедливость, устойчивое развитие, диверсификация экономики.

Введение

В современных условиях глобализации и технологических изменений традиционные модели экономического роста, ориентированные исключительно на количественные показатели, оказываются недостаточными для обеспечения устойчивого и справедливого развития регионов. Концепция инклюзивного развития, получившая широкое признание в международной практике, предполагает создание условий для участия всех социальных групп в процессах экономического роста и справедливого распределения его результатов.

Актуальность исследования обусловлена необходимостью формирования новой парадигмы регионального развития, способной обеспечить не только высокие темпы экономического роста, но и его качественные характеристики, включая социальную инклюзивность, экологическую устойчивость и пространственную сбалансированность.

Инклюзивное развитие представляет собой многомерную концепцию, объединяющую экономические, социальные и экологические аспекты устойчивого роста. Согласно определению Всемирного банка, инклюзивный рост – это рост, который создает возможности для всех слоев населения и

справедливо распределяет дивиденды увеличения благосостояния как в денежном, так и в неденежном выражении¹.

Основными принципами инклюзивного развития являются:

- Обеспечение равных возможностей доступа к ресурсам и услугам
- Создание достойных рабочих мест для всех категорий населения
- Развитие человеческого капитала и социальной инфраструктуры
- Устойчивое использование природных ресурсов
- Снижение неравенства и бедности

Исследования показывают, что инклюзивный экономический рост определяется комплексом взаимосвязанных факторов.

Таблица1. Факторы инклюзивного экономического роста

Институциональные факторы	качество государственного управления, эффективность правовой системы, уровень коррупции, политическая стабильность
Структурные факторы	диверсификация экономики, развитие малого и среднего предпринимательства, уровень технологического развития, состояние инфраструктуры
Социальные факторы	уровень образования населения, доступность здравоохранения, социальная защита, гендерное равенство
Географические факторы	природно-ресурсный потенциал, климатические условия, транспортная доступность, урбанизация

Источник: составлено автором

Для измерения уровня инклюзивности развития используются различные композитные индексы и показатели². Наиболее распространенными являются:

¹ World Bank. Inclusive Green Growth: The Pathway to Sustainable Development. Washington, DC: World Bank, 2012

² McKinley T. Inclusive Growth Criteria and Indicators: An Inclusive Growth Analytics Framework for Diagnostics of Country Progress // ADB Sustainable Development Working Paper Series. 2010. No. 14.

1. **Индекс инклюзивного развития (Inclusive Development Index, IDI)** – разработанный Всемирным экономическим форумом, учитывает рост и развитие, инклюзивность и справедливость между поколениями.
2. **Индекс инклюзивного богатства (Inclusive Wealth Index, IWI)** – оценивает устойчивость благосостояния через призму человеческого, произведенного и природного капитала.
3. **Многомерный индекс бедности (Multidimensional Poverty Index, MPI)** – измеряет депривацию в области здравоохранения, образования и уровня жизни¹⁵.

Анализ международного опыта показывает различные модели успешного инклюзивного развития³:

Скандинавская модель характеризуется высоким уровнем социальной защиты, развитой системой образования и здравоохранения, эффективным государственным управлением.

Германская модель основана на социальном рыночном хозяйстве, развитой системе профессионального образования, партнерстве работодателей и профсоюзов.

Азиатская модель развития (Южная Корея, Сингапур) демонстрирует успешное сочетание быстрого экономического роста с инвестициями в человеческий капитал и инновации.

Развивающиеся страны демонстрируют различные подходы к обеспечению инклюзивного развития:

Бразильская модель включает программы условных денежных трансфертов, инвестиции в образование и здравоохранение, политику минимальной заработной платы.

Индийская модель характеризуется развитием сельских программ занятости, программами социальной защиты, инвестициями в цифровые технологии.

Китайская модель основана на быстрой урбанизации, масштабных инвестициях в инфраструктуру, программах снижения бедности.

Заключение

Совершенствование модели экономического роста для обеспечения инклюзивного развития региона является актуальной задачей современной экономической науки и практики. Предложенная в статье комплексная модель инклюзивного развития, основанная на системном подходе и учитывающая

³ OECD. Better Policies for Inclusive Growth. Paris: OECD Publishing, 2018

международный опыт, может служить методологической основой для формирования эффективной региональной политики.

Успешная реализация модели инклюзивного развития требует координированных усилий всех заинтересованных сторон: государства, бизнеса и гражданского общества. Только такой подход может обеспечить достижение целей устойчивого и справедливого экономического роста, повышения качества жизни населения и формирования основ для долгосрочного процветания региона.

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ЗНАЧЕНИЕ ГИРУДОТЕРАПИИ ПРИ ХРОНИЧЕСКОМ ГЕПАТИТЕ

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Цель исследования: изучить терапевтическое значение гирудотерапии у пациентов с хроническим гепатитом, а также её влияние на кровообращение, воспалительные процессы и функцию печени.

Резюме. Хронический гепатит является одним из наиболее распространённых заболеваний печени, при лечении которого применяются как современные медицинские, так и традиционные методы. Гирудотерапия рассматривается как эффективный способ улучшения кровообращения, снижения воспаления и поддержки функции печени. Результаты исследования показывают, что гирудотерапия имеет значение как вспомогательная терапия при хроническом гепатите.

Ключивые слова: хронический гепатит, гирудотерапия, традиционная медицина, функция печени, воспаление, кровообращение, биологически активные вещества.

Аннотация. Изучение роли гирудотерапии и её применения в народной и современной медицине невозможно без анализа существующих научных источников, в которых отражены как исторические аспекты, так и современные клинические направления. В работах отечественных исследователей подчёркивается важность народной медицины как основы профилактики и лечения заболеваний. Так, Абдуллаева Н. и Хамроева З. указывают, что традиционные методы, включая применение пиявок, рассматривались народными целителями как способ восстановления баланса организма и очищения крови [1, с. 35–41]. Современные авторы отмечают преемственность гирудотерапии от древних времён до наших дней. Kruglova N. L. и Reshetnikov O. V. в своей работе показали, что использование медицинских пиявок имеет не только историческое значение, но и продолжает оставаться актуальным методом в дополнение к современной медицине [2, с. 47]. Похожие выводы представлены в индийских источниках: Singh A. и Kumar P. раскрывают терапевтические перспективы гирудотерапии при сердечно-сосудистых, суставных и кожных

заболеваниях, указывая на её эффективность как вспомогательного метода лечения [3, p. 102–104]. Отдельное внимание уделено кардиологическим аспектам применения гирудотерапии. Мирзаев Ш. Х. в клинических наблюдениях доказал эффективность метода при гипертонии, ишемической болезни сердца и нарушениях микроциркуляции, что подтверждает возможность его использования в кардиологической практике [4, с. 78–80]. Большое значение имеют исследования биологического механизма действия пиявки. Классическая работа Baskova I. P. и Zavalova L. L. показала, что в слюнных железах пиявки содержатся белки и пептиды с выраженным антикоагулянтным, противовоспалительным и фибринолитическим действием, что объясняет её терапевтический эффект [5, p. 705–709]. Следует отметить, что современные исследования в области народной медицины расширяют знания не только о гирудотерапии, но и о растительных средствах. Так, Хикматова М. в цикле публикаций рассматривает использование корицы как перспективного растения в народной и клинической медицине, подчёркивая её антиоксидантные и гипогликемические свойства [6, с. 17–19; 9, с. 8–12]. В другой работе автор показала методику моделирования острой почечной недостаточности у животных с использованием хлорида натрия, что имеет значение для экспериментальной фармакологии [7, с. 201–206]. Интерес также представляет исследование Bobonazarovich D. S. и Хикматовой М. Ф., посвящённое разработке смесей для коррекции сахарного диабета в народной медицине. Авторы подчёркивают, что фитотерапия и традиционные методы могут усиливать эффективность стандартных схем лечения и улучшать качество жизни пациентов [8, с. 100–105].

Таким образом, проведённый анализ источников показывает, что гирудотерапия сохраняет актуальность как часть народной медицины и доказала свою эффективность в ряде клинических направлений. Исследования, посвящённые как пиявкам, так и лекарственным растениям, свидетельствуют о необходимости комплексного подхода, где традиционные методы рассматриваются не изолированно, а в единстве с современными медицинскими практиками. Гирудотерапия как метод лечения находит своё отражение в трудах многих российских учёных, которые подчёркивают как её историческое значение, так и современные клинические перспективы. Иностранные авторы рассматривают гирудотерапию как мост между древними традициями и современными клиническими исследованиями. Их работы подтверждают высокую значимость метода при сердечно-сосудистых, хирургических и кожных патологиях, а также

открывают перспективы создания новых лекарственных средств на основе пиявочного секрета.

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РАЗВИТИЕ ЛОГИЧЕСКОГО МЫШЛЕНИЯ НА УРОКАХ МАТЕМАТИКИ В НАЧАЛЬНОЙ ШКОЛЕ

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Аннотация

В статье рассматриваются особенности формирования логического мышления младших школьников в процессе обучения математике. Раскрываются психологические и педагогические основы развития логических операций — анализа, синтеза, сравнения, классификации и обобщения. Особое внимание уделено роли задач, игровых технологий и проблемных ситуаций как средств развития логического мышления. Приводятся методические рекомендации по организации учебного процесса на уроках математики.

Ключевые слова: логическое мышление, младшие школьники, математика, учебная деятельность, познавательное развитие.

ВВЕДЕНИЕ

Развитие логического мышления является одной из важнейших задач обучения математике в начальной школе. Математика формирует у ребёнка способность к рассуждению, доказательству, установлению причинно-следственных связей и осознанному применению знаний. По мнению Л. С. Выготского, умственное развитие ребёнка происходит в процессе освоения знаковых систем и опосредованных форм деятельности. Математика как знаковая система выступает естественной средой для формирования логического мышления.

Теоретические основы развития логического мышления

По Ж. Пиаже, логическое мышление формируется постепенно, по мере перехода от наглядно-действенного к абстрактно-логическому уровню. В начальной школе важно развивать умение рассуждать на основе конкретных представлений и действий.

В отечественной педагогике (Л. С. Выготский, А. В. Запорожец, П. Я. Гальперин) подчеркивается значение поэтапного формирования умственных действий. Младший школьник усваивает логические операции через практическое действие и вербализацию собственного мышления.

Логическое мышление проявляется через умение анализировать, сравнивать, классифицировать, делать выводы. Эти операции развиваются при решении учебных задач, требующих активного умственного поиска. Например:

Анализ — выделение признаков и свойств предметов;

Сравнение — установление сходства и различий;

Синтез — объединение элементов в систему;

Классификация — распределение по признакам;

Обобщение — формулирование правил и закономерностей.

Развитие логического мышления на уроках математики.

1. Использование проблемных задач. Постановка проблемных вопросов стимулирует поисковую активность и побуждает детей рассуждать. Например: «Почему число 0 нельзя использовать как делитель?» или «Каким образом можно доказать, что фигура является квадратом?».

2. Применение игровых методов. Игры с математическим содержанием (ребусы, логические цепочки, числовые головоломки) способствуют развитию внимания, памяти и анализа.

3. Проектная и исследовательская деятельность. Создание мини-проектов («Секреты чисел», «Геометрия вокруг нас») развивает у учащихся умение делать выводы, использовать математические понятия в реальной жизни.

4. Использование наглядности и цифровых инструментов. Интерактивные презентации, обучающие платформы (LearningApps, GeoGebra) помогают визуализировать абстрактные математические зависимости и развивать логические рассуждения.

Методические рекомендации:

1. Включать в уроки задания на поиск закономерностей и формулировку правил.

2. Использовать коллективные формы работы — обсуждение, мозговой штурм, математические дискуссии.

3. Постепенно переходить от конкретных задач к абстрактным рассуждениям.

4. Осуществлять межпредметные связи — логическое мышление развивается не только на математике, но и в языке, естествознании.

Заключение

Таким образом, развитие логического мышления в начальной школе является важным условием формирования интеллектуальной культуры учащихся. Уроки математики предоставляют богатые возможности для этого процесса, так как стимулируют познавательную активность, самостоятельность и аналитическое

мышление ребёнка. Использование проблемных и игровых методов, проектных заданий и ИКТ делает обучение более осмысленным и способствует формированию устойчивых логических умений.

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ОЦЕНКА ЭФФЕКТИВНОСТИ АНТИКОАГУЛЯНТНОЙ ТЕРАПИИ У ЖЕНЩИН С ТРОМБОФИЛИЕЙ: РЕЗУЛЬТАТЫ КЛИНИЧЕСКОГО НАБЛЮДЕНИЯ

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Цель исследования

Изучить клиническую эффективность антикоагулянтной терапии у женщин с тромбофилией и повторными потерями беременности, определить оптимальные схемы лечения для профилактики тромботических осложнений и улучшения исходов беременности.

Материалы и методы исследования

Исследование проводилось на базе акушерско-гинекологического отделения Ташкентского государственного медицинского университета в 2023–2025 годах. В исследование были включены 68 женщин репродуктивного возраста (от 22 до 40 лет), у которых диагностирована наследственная или приобретённая тромбофилия и в анамнезе имелись повторные самопроизвольные выкидыши либо неразвивающаяся беременность. Пациентки были разделены на две группы: Основная группа (n=34): получала комбинированную антикоагулянтную терапию — низкомолекулярный гепарин (эноксапарин 40 мг/сут) и низкие дозы аспирина (75–100 мг/сут); Контрольная группа (n=34): получала стандартную терапию без применения антикоагулянтов. Для оценки эффективности лечения использовались клинические, лабораторные и инструментальные методы: определение уровня D-димера, фибриногена, агрегации тромбоцитов, а также ультразвуковой контроль состояния плаценты и плода в динамике. Статистическая обработка данных проводилась с использованием программы SPSS 26.0. Для анализа достоверности различий применялись методы Стьюдента и χ^2 , различия считались значимыми при $p < 0,05$.

Результаты исследования

У женщин основной группы, получавших комбинированную антикоагулянтную терапию, отмечено достоверное снижение уровня D-димера и фибриногена по сравнению с контрольной группой ($p < 0,05$). У большинства пациенток наблюдалось улучшение гемостазиологических показателей и нормализация маточно-плацентарного кровотока. Частота ранних самопроизвольных выкидышей снизилась с 41,2% (в контрольной группе) до 11,8% (в основной группе). У 85% женщин, получавших антикоагулянтную терапию, беременность завершилась рождением живого доношенного ребёнка без признаков гипоксии плода. Осложнения в виде гематом, маточных кровотечений и тромботических эпизодов встречались редко и не требовали отмены терапии. Побочные эффекты (небольшие гематомы в месте инъекций) наблюдались у 17,6% пациенток и не имели клинического значения. Таким образом, применение низкомолекулярных гепаринов в сочетании с антиагрегантами способствует улучшению течения беременности, профилактике тромботических осложнений и повышению частоты благоприятных исходов у женщин с тромбофилией.

Выводы

Тромбофилия является одним из ключевых факторов невынашивания беременности и требует своевременной диагностики и комплексного лечения. Применение низкомолекулярных гепаринов в сочетании с низкими дозами ацетилсалициловой кислоты эффективно снижает риск тромботических осложнений у женщин с тромбофилией. На фоне антикоагулянтной терапии отмечается нормализация показателей гемостаза, улучшение маточно-плацентарного кровотока и повышение частоты доношенных беременностей. Побочные эффекты терапии минимальны и не требуют прекращения лечения, что свидетельствует о её безопасности при правильном контроле дозировок. Результаты исследования подтверждают необходимость индивидуального подбора антикоагулянтной терапии у женщин с нарушениями системы гемостаза для достижения оптимальных репродуктивных исходов.

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КОМПЛЕКСНЫЙ ПОДХОД К ХИРУРГИЧЕСКОМУ ЛЕЧЕНИЮ ПРОЛАПСА ТАЗОВЫХ ОРГАНОВ С ИСПОЛЬЗОВАНИЕМ СОВРЕМЕННЫХ СЛИНГОВЫХ ТЕХНОЛОГИЙ

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АКТУАЛЬНОСТЬ.

Пролапс тазовых органов (ПТО)- одно из наиболее распространённых заболеваний у женщин зрелого возраста, составляющее до 40–60% в структуре гинекологической патологии. Развитие пролапса связано с повреждением соединительнотканых структур тазового дна, родовыми травмами, гипоестрогенией и повышением внутрибрюшного давления.

Традиционные операции (кольпорафия, фиксация швами) часто сопровождаются рецидивами, формированием рубцовых деформаций и нарушением половой функции. В последние годы внедрение слинговых технологий (TVT, TOT, TVT O) позволило значительно повысить эффективность хирургической коррекции, обеспечить физиологическое восстановление анатомии и улучшить качество жизни пациенток.

Цель исследования.

Оценить эффективность комплексного хирургического лечения пролапса тазовых органов с применением слинговой системы TVT-O и определить динамику функциональных результатов в послеоперационном периоде.

Материалы и методы.

В исследование включены 20 пациенток с пролапсом матки II–III степени и симптомами стрессового недержания мочи. Средний возраст- $54,2 \pm 5,8$ лет. Всем проведено комплексное оперативное лечение: передняя кольпорафия + установка слинга TVT-O под средней частью уретры. Оценка проводилась по шкале POP-Q (степень опущения органов) и ICIQ-SF (уровень недержания и влияние на качество жизни) до операции, через 3 и 6 месяцев. Также анализировались частота осложнений, время операции, длительность госпитализации и уровень субъективного удовлетворения пациенток.

Результаты.

Средняя длительность операции составила 45 ± 10 минут, кровопотеря- не более 100 мл.

Послеоперационный период протекал без серьёзных осложнений. В 2 случаях отмечалась лёгкая дизурия, купировавшаяся на 3–4 сутки консервативно.

По шкале POP-Q у 18 (90%) пациенток достигнуто полное восстановление анатомического положения органов малого таза (степень 0–I), у 2 (10%) – минимальное опущение без клинических проявлений.

Симптомы стрессового недержания мочи полностью исчезли у 17 (85%) пациенток, у 3 (15%) отмечено значительное улучшение (уменьшение частоты эпизодов более чем на 70%). Средний балл по шкале ICIQ-SF снизился с $18,6 \pm 2,1$ до $3,2 \pm 1,4$ ($P < 0,001$). Средний показатель улучшения качества жизни составил 89%, а уровень удовлетворённости пациенток – 95%.

Выводы.

Применение слинговой технологии TVT-О в составе комплексного хирургического лечения пролапса тазовых органов обеспечивает:

- надёжное анатомическое восстановление тазового дна,
- устранение или значительное уменьшение симптомов стрессового недержания мочи,
- короткий реабилитационный период и минимальное количество осложнений,
- высокую степень удовлетворённости пациенток результатом лечения.

Таким образом, **TVT-О** можно рассматривать как современный, безопасный и эффективный метод хирургической коррекции пролапса тазовых органов, который должен занять прочное место в клинической практике.

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CORRECTION OF IMMUNE SYSTEM CELLS BY THE HERBAL PREPARATION GULZOR BALM IN IRRADIATED ANIMALS WITH DIFFERENT ACETYLATION TYPES

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Abstract

Secondary immunodeficiency (SID) represents a dysfunction of the immune system that develops during the late postnatal period or in adulthood. It is characterized by impaired differentiation, proliferation, and adaptation of immune cells and is not associated with genetic defects. Irreversible SID may develop as a result of HIV infection, exposure to high doses of ionizing radiation, toxic effects on the hematopoietic system, lymphoproliferative and other malignant disorders, or severe bacterial, viral, and fungal infections such as tuberculosis and systemic mycoses.

Objective

This study aimed to investigate the number of nucleated immune cells in animals with different acetylation phenotypes and to evaluate the corrective potential of the herbal preparation Gulzor Balm in irradiated animals.

Materials and Methods

White outbred mice were used in the experiments. The acetylation phenotype was determined according to the method of L.N. Bulavskaya. Following phenotype identification, the animals were exposed to a sublethal dose of ionizing radiation (5 Gy). Five days after irradiation, the mice were immunized with sheep erythrocytes at a dose of $2 \times 10^8/\text{mL}$. Five days later, the number of nucleated cells was quantified in both central and peripheral immune organs. Gulzor Balm was administered intraperitoneally once, at a dose of 0.25 mL/kg, on the day of immunization. For comparative analysis, a separate group received Immunomodulin at a dose of 0.01 mL/kg.

Results

In the control group of slow acetylators (SA), the number of nucleated bone marrow cells (NBMC) was $169.4 \pm 2.2 \times 10^6/\text{mL}$. Exposure to 5 Gy resulted in a significant 1.9-fold decrease in NBMC. Administration of Gulzor Balm (0.25 mL/kg) to irradiated SA animals increased NBMC 1.6-fold, whereas Immunomodulin (0.01 mL/kg) enhanced it by 1.2-fold. In the control group of fast acetylators (FA), NBMC amounted to $119.8 \pm 1.6 \times 10^6/\text{mL}$. X-ray exposure significantly reduced NBMC 2.5-fold. Single intraperitoneal administration of Gulzor Balm restored NBMC levels in FA animals

with radiation-induced SID, while Immunomodulin increased them 1.4-fold. In intact SA animals, the number of nucleated thymic cells (NBCT) was $148.8 \pm 2.8 \times 10^6/\text{mL}$. Irradiation reduced NBCT 3.2-fold compared with the control. Gulzor Balm administration significantly increased NBCT 2.7-fold (up to $128.8 \pm 2.0 \times 10^6/\text{mL}$). Immunomodulin administration increased NBCT 1.7-fold in irradiated SA animals. In the FA control group, NBCT was $121.4 \pm 1.8 \times 10^6/\text{mL}$. Irradiation with 5 Gy led to a 2.2-fold decrease in NBCT. Single administration of Gulzor Balm (0.25 mL/kg) completely restored this parameter. Comparable results were observed following Immunomodulin administration in FA animals with SID. In the control SA group, the number of nucleated cells in mesenteric lymph nodes (NBMLN) was $88.4 \pm 1.4 \times 10^6/\text{mL}$. In irradiated SA animals, this indicator decreased 3.1-fold. Intraperitoneal administration of Gulzor Balm increased NBMLN 2.4-fold, while Immunomodulin increased it 1.7-fold. In the FA control group, NBMLN was $68.8 \pm 1.1 \times 10^6/\text{mL}$. After irradiation, this parameter significantly decreased 1.9-fold. Administration of Gulzor Balm restored the immune response to sheep erythrocytes, whereas Immunomodulin increased NBMLN 1.3-fold in irradiated FA animals.

Conclusions

1. The immunostimulatory effect of Gulzor Balm promotes the redistribution of immune cells within lymphoid organs, facilitating an effective immune response to antigenic stimulation. This effect depends on the acetylation phenotype under radiation-induced secondary immunodeficiency.
2. The herbal preparation Gulzor Balm exhibits a differential modulatory influence on various components of the immune system.

O'QUVCHILARNI HAMKORLIKDA ISHLASH KOMPETENSIYALARINI SHAKLLANTIRISHNING PEDAGOGIK ASOSLARI

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Annotatsiya: Ushbu maqolada o'quvchilarda hamkorlikda ishlash kompetensiyasini shakllantirishning mazmuni, ahamiyati va pedagogik asoslari yoritiladi. Hamkorlik kompetensiyasi o'quvchilarning shaxsiy rivojlanishi, ijtimoiy moslashuvi hamda kasbiy tayyorgarligida muhim omil sifatida tahlil qilinadi.

Kalit so'zlar: hamkorlik, kompetensiya, muloqot, jamoaviy faoliyat, interfaol metodlar, kommunikativ rivojlanish.

Zamonaviy kasbiy ta'limi tizimini raqamlashtirish jarayonlarining jadallashuvi, mehnat bozoridagi dinamik o'zgarishlar hamda bitiruvchilarga qo'yilayotgan kasbiy va shaxsiy kompetensiyalar bo'yicha talablarning ortib borishi sharoitida tub islohotlarni boshdan kechirmoqda. Ushbu holat kasb-hunar ta'limi mazmuni va uni amalga oshirishning metodik asoslarini qayta ko'rib chiqishni taqozo etadi. Shuningdek, boshqaruv kompetensiyalarini shakllantirishga xizmat qiluvchi samarali pedagogik yondashuvlarni aniqlash va joriy etish mehnat bozorining zamonaviy talablari bilan uyg'un holda kadrlar tayyorlash sifatini oshirishning muhim omili sifatida namoyon bo'lmoqda.

O'zbekiston Respublikasi Prezidentining 2025-yil 19-martdagi PF-51-son Farmonida maktabgacha va maktab ta'limi sohasida boshqaruv tizimini yanada takomillashtirishga doir strategik yo'nalishlar belgilab berilgan. Mazkur hujjat ta'lim muassasalari faoliyati samaradorligini oshirish, ta'lim xizmatlarining zamonaviy sifat ko'rsatkichlarini ta'minlash, hamda raqobatbardosh kadrlar salohiyatini rivojlantirish uchun zarur tashkiliy-huquqiy va metodik shart-sharoitlarni yaratishga qaratilgan.

PF-51-son Farmonining qabul qilinishi ta'lim tizimida bilim sifati monitoringini kuchaytirish, rahbar va pedagog xodimlarning mas'uliyatini oshirish, hamda zamonaviy boshqaruv amaliyotlarini joriy etish orqali ta'limni boshqarishning butun tizimini modernizatsiya qilish yo'nalishidagi muhim bosqich sifatida e'tirof etiladi. [1]. Bugungi kunda ta'lim tizimi o'quvchilardan nafaqat bilim va ko'nikmalarni egallashni, balki ularni amaliyotda, jamoaviy faoliyatda samarali qo'llashni ham talab qilmoqda. Shu bois hamkorlikda ishlash kompetensiyasini shakllantirish zamonaviy pedagogikaning eng dolzarb vazifalaridan biri sanaladi. Ushbu kompetensiya

o'quvchilarning birgalikda ishlash, o'zaro muloqot qilish, fikr almashish, mas'uliyatni bo'lishish va umumiy maqsad sari intilish qobiliyatlarini ifodalaydi.

Hamkorlik kompetensiyasi o'quvchi shaxsining ijtimoiylashuviga, jamoaviy faoliyatga moslashuviga, muloqot madaniyatini egallashiga xizmat qiladi. Bu jarayonda o'quvchi o'z fikrini erkin ifoda etadi, boshqalarni tinglashni, turli nuqtayi nazarlarni qabul qilishni, muammolarni kelishuv asosida hal etishni o'rganadi. Shunday qilib, hamkorlik kompetensiyasi nafaqat ta'lim jarayonidagi muvaffaqiyatni, balki kelajakdagi kasbiy hayotda ham samarali faoliyat yuritish imkonini yaratadi.

Mazkur kompetensiya o'quvchilarda kommunikativ, ijtimoiy, tashkiliy va refleksiv sifatlarni uyg'unlashtiradi. O'quvchi jamoa a'zosi sifatida nafaqat o'zining, balki butun guruhning muvaffaqiyati uchun mas'ul ekanini anglaydi. Shu bilan birga, o'z faoliyatini baholash, jamoaning ishini tahlil qilish, xatolardan xulosa chiqarish qobiliatlari ham rivojlanadi.

Hamkorlik kompetensiyasini shakllantirishda o'qituvchining roli beqiyosdir. U o'quvchilarga birgalikdagi faoliyat uchun qulay muhit yaratishi, guruhli o'qitish shakllarini yo'lga qo'yishi, o'zaro ishonch, hurmat va muloqot madaniyatini qo'llab-quvvatlashi zarur. Interfaol metodlar — aqliy hujum, muammoli ta'lim, loyiha asosida o'qitish, rol o'ynash, hamkorlikdagi muhokama kabi usullar o'quvchilarning faol ishtirokini ta'minlaydi. Shu jarayonda ular bir-biridan o'rganadi, o'z g'oyalarini himoya qiladi va jamoaviy qaror qabul qilishni o'rganadi. Ibroximov Maqsadjon Axmedovichning fikricha "Kompetensiyaviy ta'lim o'quvchilarning ma'lum bilimlar yig'indisini egallashnigina emas, balki shaxsni rivojlantirish, anglash va yaratish qobiliyatlarini o'stirishni mo'ljallaydi" [2].

Xorijiy ilmiy ishlarda hamkorlikda ishlashning guruhli shaklini imkoniyatlarini yoriyib berishga alohida urg'u qaratilgan. Jumladan, D.V.Jonson, R.T.Jonsonlar o'quvchilarning individual o'quv-bilish faoliyatini kichik guruhlardagi birgalikda ishlash bilan uyg'unlashtirishni taklif etishgan [3]. D.de Friz (D. DeVries) va K.Edvards (K. Edwards) [4] o'quv-bilish faoliyatidagi o'quvchilarning birgalikdagi faoliyatini tashkil etishning guruhli shaklini tashkil etishning o'yin usullarini bayon etishgan.

Birgalikda ishlayotganda, odamlar birgalikda "yaxshi qilish" maqsadiga intiladilar, ular o'zlarini jamoaning boshqa a'zolari bilan taqqoslamaydilar, resurslar va ma'lumotlardan birgalikda foydalanadilar, yordam so'rashga yoki boshqalarga o'z yordamini taklif qilishga tayyor bo'ladilar. tengma-tent, hurmat bilan gaplashadilar. Hamkorlik munozaralarni istisno qilmaydi, argumentlarga qo'shilmaslik, optimal yechimlarni izlash. Jamoa muvaffaqiyati shaxsiy muvaffaqiyat sifatida qabul qilinadi va shaxsiy resurslarni umumiy ishga yanada ko'proq sarflashga undaydi. Boshqa

narsalar qatorida, hamkorlik yaratishi isbotlangan ijobiy psixologik fon va salomatlikka ijobiy ta'sir ko'rsatadi [5].

Shunday qilib Rusakova T.S fikricha, yoshlarning hamkorlik kompetensiyasini quyidagicha tavsiflash mumkin: u yosh avlodning umumiy maqsadlarga erishish yo'lida birgalikdagi muvofiqlashtirilgan faoliyatga shaxsiy salohiyatini integral ko'rsatkichi sifatida namoyon bo'ladi; jamoada samarali o'zaro hamkorlik usullarini amalga oshirish qobiliyatida ifodalanuvchi, ijtimoiy ahamiyatga ega vazifalarni hal etishga yo'naltirilgan va yoshlarning jamoaviy ishga faol sub'ekt sifatida munosabatini ta'minlaydigan asosiy kompetensiya hisoblanadi [6].

Xulosa qilib aytganda, o'quvchilarda hamkorlik kompetensiyasini shakllantirish — bu zamonaviy ta'limning asosiy yo'nalishlaridan biridir. U nafaqat ta'lim jarayonini faollashtiradi, balki shaxsiy va kasbiy rivojlanishning poydevorini yaratadi. Hamkorlikda ishlay oladigan o'quvchi — bu ijtimoiy jihatdan yetuk, mas'uliyatli, muloqotga ochiq, kelajakda jamoaviy faoliyatda muvaffaqiyat qozonadigan shaxsdir.

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INSULIN PREPARATION FOR LOWERING SUGAR IN DIABETIC HEAL DISEASE (VICTOSA)

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Relevance of the problem: There are more than 400 million people with diabetes in the world, and diabetes is a chronic disease related to metabolism, more specifically, insulin, and it is considered one of the non-infectious (non-communicable) diseases that have been increasing dramatically among the population in recent years. Over the past 25 years, the number of adults with diabetes has quadrupled. There are many misconceptions about this disease.

The purpose of the work: as the purpose of the work, to study the mechanism of action of Victoza insulin in patients with type 2 diabetes mellitus living in the city of Nukus, Republic of Karakalpakstan, and make a statistical analysis.

Test method and materials: We investigated the mechanism of action of Victoza in patients with type 2 diabetes mellitus who applied to the family polyclinic in the city of Nukus, Republic of Karakalpakstan.

Inspection results: During the inspection, it was found that there were 100 patients in total in 2023, of which 65 were male and 35 were female patients. In a retrospective review of archival data of patients, as a result of anamnesis and laboratory findings, a high rate of type 2 diabetes mellitus, ie 65%, was male patients. In the identified patients, symptoms such as dryness of the mouth, general weakness, sleep disorders, diuresis in small amounts and frequent discharges were expressed.

In the laboratory examination, it was found that the amount of sugar in the blood is on average 8.8-12.5 m/mol, and the amount of sugar in the urine is 0.5-1.5 m/mol. In 15% of male patients with diabetes mellitus, discoloration of the fingers was observed in the right big toe due to acute circulatory disorders.

Conclusion: in conclusion, it can be said that the identified patients mainly suffer from eating disorders, stressful situations in the social environment, and the patient's indifference to his health without going to the examination on time. The reason for this was that they did not take the anti-diabetic drugs recommended by the doctors on time, and that they did not go to the medical examination every month.

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FANLARARO ALOQADORLIK ASOSIDA O‘QUVCHILARNING SO‘Z BOYLIGINI KENGAYTIRISH YO‘LLARI.

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Annatatsiya. O‘quvchilarning so‘z boyligini kengaytirishda fanlararo aloqadorlikning o‘rni va ahamiyati tahlil qilingan. Fanlararo integratsiya o‘quvchilarga til materialini chuqurroq o‘zlashtirish, boshqa fanlarda o‘rganilgan tushunchalarni nutqiy faoliyatda qo‘llash imkonini yaratadi.

Kalit so‘zlar: Fanlararo aloqadorlik, so‘z boyligi, integratsiya, nutqiy faoliyat, og‘zaki nutq, yozma nutq, ijodiy fikrlash, metodika, interfaol usullar, til madaniyati, kompetensiya.

Hozirgi kunda ta‘lim tizimida o‘quvchilarning shaxsiy rivojlanishida asosiy e‘tibor ularning nutqiy faoliyatini shakllantirish, so‘z boyligini kengaytirish va mustaqil fikrlash ko‘nikmasini rivojlantirishga qaratilmoqda. Bu jarayonda fanlararo aloqadorlik tamoyili muhim ahamiyat kasb etadi. Fanlararo aloqadorlik -bu bir fan orqali boshqa fanlarning mazmunini boyitish, ularni o‘zaro bog‘liqlikda o‘qitish orqali o‘quvchilarda keng dunyoqarash, chuqur bilim va mustahkam nutqiy ko‘nikmalarni shakllantirish demakdir. Ayniqsa, ona tili fanida bu tamoyildan foydalanish o‘quvchining so‘z boyligini oshirish, nutqni ifodali va aniq shaklda qurish imkonini beradi. Fanlararo aloqadorlikning o‘quvchi nutqini rivojlantirishdagi o‘rni juda muhimdir. Til - barcha fanlarning asosi va ularni o‘zlashtirish vositasidir. O‘quvchi boshqa fanlardan olgan bilimlarini so‘z orqali ifodalaydi. Shu bois, har bir fanda nutqiy faoliyatni rivojlantirishga e‘tibor berish zarur. Fanlararo yondashuv bu o‘quvchining bilimini tizimlashtiradi, til boyligini turli fanlarga oid atamalar bilan kengaytiradi, fikrni mantiqan ifodalashga o‘rgatadi, o‘qitish jarayonida til bilan tafakkurni uyg‘unlashtiradi. Masalan, tabiiy fandan “O‘simliklarning foydasi” mavzusi bilan bog‘lab “Tabiat bizning boyligimiz” mavzusida insho yozish o‘quvchilarning leksik zahirasi tabiiy so‘zlar bilan boyitadi. O‘qish savodxonligi darslarida esa “Amir Temur” yoki “Qadimgi binolar” kabi mavzularda so‘zlashish, insho yozish orqali tarixiy atamalarni to‘g‘ri qo‘llash ko‘nikmasi shakllanadi. So‘z boyligini kengaytirishda integratsiyaning metodik imkoniyatlari o‘quvchilarning so‘z boyligini oshirish uchun o‘qituvchi fanlararo integratsiyadan samarali foydalanishi zarur.

Quyidagi metodlar bunga yordam beradi. Matn asosida ishlash tabiiy fan yoki o'qish savodxonligi fanidan olingan matnni tahlil qilish, yangi so'zlarni ajratib, ularning ma'nosini tushuntirish, matndagi yangi so'zlardan gap yoki kichik hikoya tuzish va atamalar bilan ishlash matematika fanidagi "radius", "diametr", "aylana" kabi so'zlarni o'zlashtirib, ularni to'g'ri nutqda qo'llash. Tabiiy fandan "sayyoralar", "organizm", "hujayra" kabi so'zlarni tushunish va ularni so'z boyligiga kiritish orqali nutqi yanada boyib boradi. Fanlararo suhbat va munozaralarga "Ilm - inson tafakkuri mevasi", "Texnologiya hayotimizni osonlashtiradimi?" kabi mavzularda bahs-munozaralar tashkil etishimiz mumkin. Bu usul o'quvchilarning og'zaki nutqini boyitadi va so'zlardan to'g'ri foydalanishga o'rgatadi. Yozma mashg'ulotlardan boshqa fanlarga oid mavzularda insho, matn, diktant yoki bayon yozish orqali so'z boyligini kengaytirish. Masalan: "Yer – bizning umumiy uyimiz" (tabiiy fan bilan bog'liq) yoki "Buyuk allomalar merosi" (o'qish savodxonligi bilan bog'liq).

Interfaol metodlar orqali so'z boyligini rivojlantirishda bugungi kunda fanlararo integratsiya asosida o'qitishda interfaol metodlar keng qo'llanilmoqda. Jumladan "Klaster" metodi - o'quvchilar yangi mavzuga oid so'zlarni tarmoqlab yozadilar va ularni tushuntiradilar. "Aqliy hujum" - o'quvchilar mavzuga oid so'zlarni to'plashadi, izoh berishadi, gap tuzishadi. "Konsept xarita"- o'quvchilar fanlararo tushunchalarni bog'lab, ularni bir butun fikr shaklida ifodalaydilar.

Bu usullar o'quvchilarda yangi so'zlarni faol nutqga kiritish, ularning ma'nosini anglab yetish va ijodiy qo'llash malakasini rivojlantiradi.

O'qituvchi faoliyatida fanlararo yondashuvning ahamiyati shundaki o'qituvchi har bir darsni rejalashtirish jarayonida boshqa fanlar bilan bog'lash yo'llarini oldindan belgilab olishi kerak. Masalan ona tili darsida "Tabiat go'zalligi" mavzusi o'tilayotganda tabiiy fan darslaridagi bilimlardan foydalanish, yozma mashg'ulotlarda matematika darslarida o'rganilgan sonlar, o'lchov birliklari va ularning yozilishiga oid misollar kiritish, o'qish savodxonligi darslarida tarixiy voqealar yoki shaxslar haqida so'z yuritish ahamiyatlidir. Bunday yondashuv o'quvchilar nutqini tabiiy, boy va ifodali qiladi.

Xulosa. Fanlararo aloqadorlik asosida o'qitish o'quvchilarning so'z boyligini kengaytirish, nutq madaniyatini shakllantirish va ijodiy fikrlash ko'nikmalarini rivojlantirishda muhim o'rin tutadi. Bu yondashuv orqali o'quvchi so'zlarni ma'no jihatdan chuqurroq anglaydi, yangi so'zlarni nutqida faol qo'llay oladi, til materialini hayotiy tajribalar bilan bog'laydi, mustaqil va mantiqiy fikrlashni o'rganadi. Fanlararo integratsiya — bu so'z boyligini kengaytirishning, nutqiy faoliyatni rivojlantirishning

va o'quvchini zamonaviy kompetensiyalarga ega shaxs sifatida shakllantirishning eng samarali usullaridan biridir.

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DILATATATION KARDIOMIOPATIYA: KLINIK FENOTIPLAR, GENETIK ASOSLAR VA PROGNOZ BAHOSI

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ANNOTATSIYA: Dilatatatsion kardiomiopatiya (DKM) – bu yurak mushak to‘qimasining progressiv kengayishi va kontraktil funksiyasining pasayishi bilan tavsiflanadigan murakkab etiologiyaga ega kasallik bo‘lib, yurak yetishmovchiligi, aritmiyalar va to‘satdan yurak o‘limining asosiy sababi sifatida tanilgan. Ushbu maqolada DKMning klinik fenotiplarini, genetik asoslarini hamda prognoz ko‘rsatkichlarini o‘rganish orqali zamonaviy diagnostika va davolash strategiyalarini takomillashtirish masalalari yoritilgan. Tadqiqot davomida miokardial remodellasiyaning patofiziologik mexanizmlari, sarkomer va sitoskelet genlaridagi (TTN, LMNA, DSP, BAG3, MYH7 va boshqalar) mutatsiyalarning roli hamda virusli va autoimmun komponentlarning o‘zaro ta’siri tahlil qilindi. Klinik fenotipik farqlar – oilaviy va idiopatik shakllar, aritmogen variantlar, peripartum va alkogolli DKM shakllari – batafsil tavsiflandi. Shuningdek, biomarkerlar (NT-proBNP, troponin I/T, galektin-3) va tasviriy diagnostika (EKO, MRT, genetik testlar) yordamida prognoz bahosi tizimlashtirildi. Maqolada shuningdek, farmakogenetik yondashuvlar, yurak transplantatsiyasigacha bo‘lgan mexanik yordam qurilmalari, gen terapiyasi va molekulyar darajadagi rehabilitatsiya imkoniyatlari tahlil qilindi. Tadqiqot natijalari shuni ko‘rsatdiki, DKMning kelib chiqishida genetik va ekologik omillar o‘zaro murakkab aloqadorlikda bo‘lib, individual yondashuv asosidagi prognoz baholash kasallik oqibatlarini kamaytirishda muhim rol o‘ynaydi.

Kalit so‘zlar: Dilatatatsion kardiomiopatiya, yurak yetishmovchiligi, genetik mutatsiyalar, sarkomer genlari, TTN, LMNA, prognoz bahosi, biomarkerlar, miokardial remodellasiyaning mexanizmlari.

DILATED CARDIOMYOPATHY: CLINICAL PHENOTYPES, GENETIC BASIS, AND PROGNOSTIC ASSESSMENT

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ABSTRACT: Dilated cardiomyopathy (DCM) is a multifactorial myocardial disorder characterized by progressive ventricular dilation and impaired systolic function, representing one of the leading causes of heart failure, arrhythmias, and sudden cardiac death worldwide. This article provides a comprehensive analysis of the clinical phenotypes, genetic underpinnings, and prognostic determinants of DCM with a focus on advancing modern diagnostic and therapeutic strategies. The study explores the molecular mechanisms of myocardial remodeling, highlighting the contribution of sarcomeric and cytoskeletal gene mutations (TTN, LMNA, DSP, BAG3, MYH7, etc.) and the interplay of viral and autoimmune factors. Phenotypic heterogeneity—including familial, idiopathic, arrhythmogenic, peripartum, and alcohol-related forms—is extensively reviewed. Biomarkers such as NT-proBNP, troponin I/T, and galectin-3, together with advanced imaging (echocardiography, cardiac MRI) and genetic screening, are discussed as key tools for prognostic assessment. The paper also evaluates pharmacogenetic approaches, the use of mechanical circulatory support prior to transplantation, and novel perspectives on gene therapy and molecular-level cardiac rehabilitation. The findings underscore that DCM development results from a complex interplay between genetic predisposition and environmental factors, emphasizing the need for individualized risk stratification to optimize patient outcomes.

Keywords: Dilated cardiomyopathy, heart failure, genetic mutations, sarcomeric genes, TTN, LMNA, prognosis assessment, biomarkers, myocardial remodeling.

**ДИЛАТАЦИОННАЯ КАРДИОМИОПАТИЯ: КЛИНИЧЕСКИЕ
ФЕНОТИПЫ, ГЕНЕТИЧЕСКИЕ ОСНОВЫ И ОЦЕНКА ПРОГНОЗА**

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АННОТАЦИЯ: Дилатационная кардиомиопатия (ДКМ) представляет собой полиэтиологическое заболевание миокарда, характеризующееся прогрессирующим расширением полостей сердца и снижением сократительной функции, являясь одной из ведущих причин хронической сердечной недостаточности, аритмий и внезапной сердечной смерти. В настоящей статье рассматриваются клинические фенотипы, генетические детерминанты и прогностические факторы ДКМ, а также современные подходы к диагностике и терапии. Особое внимание уделено молекулярным механизмам ремоделирования миокарда и роли мутаций в саркомерных и цитоскелетных генах (TTN, LMNA, DSP, BAG3, MYH7 и др.), а также взаимосвязи вирусных и аутоиммунных факторов. Описаны различные фенотипические варианты заболевания — семейная, идиопатическая, аритмогенная, перипартальная и алкогольная формы. Представлен анализ диагностических биомаркеров (NT-proBNP, тропонин I/T, галектин-3) и визуализационных методов (эхокардиография, МРТ, генетическое тестирование) в оценке прогноза. Рассмотрены современные направления лечения, включая фармакогенетические подходы, применение механических устройств поддержки кровообращения, а также перспективы генной терапии и молекулярной реабилитации миокарда. Полученные данные подтверждают, что формирование ДКМ является результатом сложного взаимодействия генетических и экзогенных факторов, что требует индивидуализированной стратегии прогностической оценки для улучшения клинических исходов.

Ключевые слова: дилатационная кардиомиопатия, сердечная недостаточность, генетические мутации, гены саркомера, TTN, LMNA, оценка прогноза, биомаркеры, ремоделирование миокарда.

INTRODUCTION

Dilated cardiomyopathy (DCM) represents one of the most clinically heterogeneous and genetically complex forms of myocardial disease, characterized by dilation of the left or both ventricles and impaired systolic performance in the absence of abnormal loading conditions or significant coronary artery disease. As a leading cause of heart failure and sudden cardiac death among young adults, DCM poses a significant public health burden, accounting for approximately 40% of all cases of heart transplantation worldwide. Despite remarkable progress in cardiovascular medicine over the past decades, the pathogenesis, molecular mechanisms, and prognostic determinants of DCM remain incompletely understood, underscoring the need for a multidisciplinary approach that integrates genetics, molecular biology, and advanced imaging modalities. Historically, DCM was viewed as a non-specific end stage of myocardial

damage caused by infections, toxins, or metabolic disturbances. However, the advent of next-generation sequencing and molecular genetics has fundamentally redefined this concept. It is now recognized that up to 50–60% of DCM cases have a familial or genetic origin, with pathogenic variants identified in over 60 genes encoding sarcomeric, cytoskeletal, desmosomal, and nuclear envelope proteins. Mutations in the *TTN* gene (encoding titin) are the most frequent, accounting for approximately one-third of genetic DCM cases, followed by variants in *LMNA*, *BAG3*, *MYH7*, and *DSP*. These genetic discoveries have provided new insights into the molecular architecture of the disease and opened perspectives for genotype-guided risk stratification and targeted therapy.

The clinical manifestations of DCM are equally diverse, ranging from asymptomatic left ventricular dilation detected incidentally to severe, end-stage heart failure refractory to medical treatment. In many patients, DCM presents with ventricular arrhythmias, conduction disturbances, or thromboembolic complications, reflecting the multi-systemic impact of myocardial remodeling. Furthermore, DCM may arise as a secondary phenomenon in response to viral myocarditis, autoimmune disorders, pregnancy (peripartum cardiomyopathy), chronic alcohol consumption, or chemotherapeutic toxicity. The overlap between genetic susceptibility and environmental stressors further complicates the clinical course and prognostic evaluation. From a pathophysiological perspective, DCM is characterized by progressive ventricular wall thinning, myocyte elongation, and interstitial fibrosis, leading to a decline in contractile function and cardiac output. Neurohormonal activation, particularly involving the renin–angiotensin–aldosterone system (RAAS) and sympathetic nervous system, contributes to maladaptive remodeling and accelerates disease progression. Recent studies have also highlighted the roles of mitochondrial dysfunction, oxidative stress, and impaired calcium homeostasis as pivotal contributors to myocardial energy imbalance and cellular apoptosis. Accurate prognostic assessment in DCM remains a cornerstone of patient management. While traditional clinical indicators such as left ventricular ejection fraction (LVEF), NYHA functional class, and arrhythmic risk continue to guide treatment decisions, the emergence of novel biomarkers and imaging tools has enhanced the precision of prognostic evaluation. Circulating biomarkers such as NT-proBNP, troponins, and galectin-3 reflect the degree of myocardial stress and fibrosis, whereas cardiac magnetic resonance imaging (MRI) with late gadolinium enhancement provides noninvasive quantification of myocardial scarring and inflammation. Integrating these modalities into clinical practice allows for a more comprehensive understanding of disease severity and facilitates individualized therapeutic strategies.

TABLE 1. GENETIC VARIANTS AND CLINICAL OUTCOMES IN DCM PATIENTS

Gene	Patients with Variant (n)	Mean Age at Diagnosis (years)	LVEF (%)	Arrhythmias (%)	1-year Mortality (%)
TTN	44	49.2 ± 11.3	34.1 ± 7.0	15.9	9.1
LMNA	18	42.1 ± 10.8	28.7 ± 6.5	46.7	22.2
BAG3	11	50.3 ± 13.2	31.5 ± 7.4	18.2	18.2
DSP	10	47.0 ± 12.0	30.8 ± 6.9	40.0	20.0
MYH7	8	46.5 ± 12.5	33.2 ± 7.1	12.5	12.5
VUS (Variants of Uncertain Significance)	23	48.7 ± 11.8	32.0 ± 7.5	17.4	8.7

Notes:

- LVEF = Left Ventricular Ejection Fraction
- LVEDD = Left Ventricular End-Diastolic Diameter
- AF = Atrial Fibrillation
- VUS = Variant of Uncertain Significance

The importance of recognizing DCM's genetic background extends beyond diagnosis—it fundamentally reshapes the approach to patient care. Genetic counseling and cascade screening enable early identification of asymptomatic carriers, allowing timely intervention before the onset of irreversible myocardial damage. Moreover, pharmacogenetic research has begun to elucidate why certain genotypes respond differently to conventional therapies such as β -blockers, ACE inhibitors, and mineralocorticoid receptor antagonists. This personalized approach, grounded in molecular evidence, represents the future of precision cardiology. Given the multifactorial nature of DCM, the objective of the present study is to provide an integrative analysis of its **clinical phenotypes, genetic basis, and prognostic determinants**. By synthesizing contemporary research findings from cardiogenetics, imaging, and molecular cardiology, this work aims to deepen the understanding of

DCM as a dynamic interplay between hereditary predisposition and acquired triggers. Furthermore, it seeks to outline the current diagnostic challenges, therapeutic advancements, and emerging prognostic models that may redefine risk assessment and management in the coming decade. Through this comprehensive evaluation, we emphasize that the future of DCM management lies in **genotype-driven, phenotype-guided, and prognosis-oriented cardiology**, where precision medicine will enable both early prevention and individualized therapy.

MATERIALS AND METHODS

Study design and population - This study was designed as a prospective, observational, and partially genetic cohort investigation conducted at the Department of Cardiology and Molecular Medicine between January 2020 and June 2024. A total of **212 patients** diagnosed with **dilated cardiomyopathy (DCM)** were enrolled according to the diagnostic criteria established by the **European Society of Cardiology (ESC, 2023)** and the **American Heart Association (AHA, 2022)**. The inclusion criteria encompassed: (1) left ventricular dilation (end-diastolic diameter > 56 mm in men, > 52 mm in women); (2) left ventricular ejection fraction (LVEF) < 45% confirmed by echocardiography or cardiac MRI; (3) absence of significant coronary artery disease, valvular lesions, or uncontrolled hypertension. The control group consisted of **80 healthy volunteers** matched for age, sex, and body mass index (BMI), without cardiovascular pathology or metabolic disorders. All participants provided written informed consent, and the study protocol was approved by the Institutional Ethics Committee in accordance with the Declaration of Helsinki (2013 revision).

Clinical and phenotypic assessment - all patients underwent a comprehensive **clinical evaluation**, including medical history, physical examination, and cardiovascular risk profiling. Symptoms were classified according to the **New York Heart Association (NYHA)** functional scale. Detailed family histories extending up to three generations were collected to identify familial clustering and inheritance patterns. Echocardiographic analysis was performed using **Philips iE33** and **GE Vivid E95** ultrasound systems. The following parameters were recorded: left ventricular end-diastolic (LVEDD) and end-systolic diameters (LVESD), LVEF (Simpson's method), left atrial size, and right ventricular function (TAPSE). Cardiac MRI was conducted in 68 randomly selected patients using **1.5-T Siemens Avanto** scanners to assess ventricular volumes, myocardial fibrosis, and late gadolinium enhancement (LGE).

Genetic and molecular analysis - peripheral venous blood samples were obtained from all participants for **genomic DNA extraction** using the QIAamp DNA Blood Mini Kit (Qiagen, Germany). Genetic testing was performed by **next-generation sequencing (NGS)** using the Illumina MiSeq platform, targeting a **panel of 72 genes** implicated in hereditary cardiomyopathies, including *TTN*, *LMNA*, *MYH7*, *DSP*, *TNNT2*, *BAG3*, and *DES*. Sequence alignment and variant calling were carried out with the **GATK pipeline (v4.2)** and annotated using **ClinVar**, **gnomAD**, and **HGMD Professional** databases. Pathogenicity was classified according to the **ACMG guidelines (2015)**. Variants of uncertain significance (VUS) were further analyzed by segregation testing and computational modeling using **PolyPhen-2**, **SIFT**, and **MutationTaster**. To investigate the **molecular mechanisms of myocardial remodeling**, plasma levels of selected biomarkers were measured, including **NT-proBNP**, **cardiac troponin I**, **galectin-3**, and **high-sensitivity C-reactive protein (hsCRP)** using enzyme-linked immunosorbent assay (ELISA) kits (R&D Systems, USA).

Statistical analysis - all statistical analyses were performed using **IBM SPSS Statistics v27.0** and **GraphPad Prism v10**. Quantitative variables were expressed as mean $\pm$ standard deviation (SD) or median with interquartile range (IQR), depending on data distribution. The **Shapiro–Wilk test** was applied to assess normality. Comparisons between groups were made using **Student’s t-test** or **Mann–Whitney U test** for continuous variables, and **Chi-square test** for categorical variables. Multivariate logistic regression models were constructed to evaluate the association between genetic variants and clinical outcomes, adjusting for age, sex, hypertension, diabetes, and LVEF. Survival analysis was conducted using **Kaplan–Meier curves** and **Cox proportional hazards regression** to estimate predictors of all-cause mortality and heart transplantation. A **p-value < 0.05** was considered statistically significant.

Ethical considerations - all procedures involving human participants were conducted in strict accordance with ethical standards. Genetic counseling was offered to all patients identified with pathogenic or likely pathogenic variants, and family members were invited for cascade genetic screening. Data confidentiality was maintained throughout the research process using de-identified sample coding and secure electronic databases.

Study limitations - the study recognizes several limitations, including a moderate sample size and potential selection bias due to recruitment from tertiary care centers. Furthermore, environmental and lifestyle factors (e.g., alcohol intake, viral infections) were self-reported, which may have introduced reporting bias. Despite these constraints, the integration of clinical, genetic, and prognostic data offers a robust framework for understanding DCM's heterogeneity and guides further translational studies.

RESULTS

1. General clinical characteristics of the study population

A total of **212 patients** with confirmed **dilated cardiomyopathy (DCM)** and **80 healthy controls** were included in the final analysis. The mean age of DCM patients was **48.6 ± 12.4 years**, with a male predominance (**68.9%**). The majority of patients presented with symptoms consistent with **NYHA class II–III heart failure**, including exertional dyspnea (78.3%), fatigue (65.6%), and peripheral edema (41.2%). Left ventricular end-diastolic diameter (LVEDD) averaged **65.8 ± 8.6 mm**, and the mean ejection fraction (LVEF) was **32.7 ± 7.4%**, significantly lower than that of healthy controls (**61.4 ± 5.9%**, $p < 0.001$). **Atrial fibrillation** was present in **22.6%** of cases, and **ventricular arrhythmias** (including nonsustained VT) were observed in **18.9%**. Comorbidities included **hypertension (34.9%)**, **type 2 diabetes mellitus (17.5%)**, and **chronic kidney disease (9.0%)**.

2. Distribution of clinical phenotypes

Patients were categorized according to phenotypic subtypes (Table 1). The **idiopathic form** was the most common, representing **46.2%** of cases. **Familial DCM** accounted for **31.6%**, identified through positive family history or genetic variants in first-degree relatives. Other phenotypes included **alcohol-induced (10.8%)**, **peripartum (6.1%)**, and **post-viral (5.3%)** DCM. MRI findings demonstrated **late gadolinium enhancement (LGE)** in **57.4%** of cases, predominantly in the mid-myocardial and subepicardial layers, indicating chronic fibrotic remodeling.

TABLE 2. CLINICAL AND PHENOTYPIC CHARACTERISTICS OF DCM PATIENTS

Parameter	Total (n=212)	Familial DCM (n=67)	Idiopathic DCM (n=98)	Secondary DCM (n=47)	p- value
Age (years)	48.6 ± 12.4	45.8 ± 11.2	49.7 ± 12.8	51.3 ± 13.0	0.071

Male (%)	68.9	71.6	66.3	68.1	0.481
LVEF (%)	32.7 ± 7.4	31.9 ± 6.9	33.1 ± 7.5	33.4 ± 7.2	0.623
NT-proBNP (pg/mL)	3780 ± 1650	3950 ± 1520	3720 ± 1710	3620 ± 1680	0.274
LGE on MRI (%)	57.4	63.5	54.1	49.0	0.182
1-year mortality (%)	12.3	14.9	10.2	9.8	0.319

3. Genetic findings - next-generation sequencing (NGS) identified pathogenic or likely pathogenic variants **in** 114 of 212 patients (53.8%). **The most frequently mutated gene was TTN, observed in 38.6% of genetically positive cases, followed by LMNA (15.8%), BAG3 (9.6%), DSP (8.7%), and MYH7 (7.0%). Multiple variants (compound heterozygosity) were detected in 11 patients (5.2%). Patients harboring LMNA mutations exhibited earlier disease onset (mean age 42.1 years), higher incidence of ventricular arrhythmias (46.7%), and greater progression to end-stage heart failure ($p = 0.003$). In contrast, TTN truncating variants were associated with a more variable phenotype, ranging from mild systolic dysfunction to advanced DCM requiring transplant evaluation.**

4. Biomarker and imaging correlations - elevated NT-proBNP and troponin I levels showed a strong inverse correlation with LVEF ($r = -0.64, p < 0.001$) and a positive correlation with myocardial fibrosis extent on MRI ($r = 0.59, p < 0.001$). Galectin-3, a marker of myocardial fibrosis, was significantly higher in LMNA-positive and DSP-positive individuals (mean 19.6 ± 5.4 ng/mL) compared to mutation-negative subjects (13.2 ± 4.7 ng/mL; $p < 0.01$). Subgroup analysis revealed that patients with LGE-positive MRI findings had a 3.5-fold higher risk of adverse cardiac events (heart failure hospitalization or death) compared to LGE-negative patients (HR 3.47, 95% CI: 2.14–5.62, $p < 0.001$).

5. Prognostic assessment - during a median follow-up of 30 months (IQR: 24–36), 26 patients (12.3%) died and 14 (6.6%) underwent heart transplantation. Kaplan–Meier survival analysis demonstrated significantly reduced survival in patients with LMNA or DSP mutations compared to mutation-negative groups ($\log\text{-rank } p < 0.001$). Multivariate Cox regression identified the following independent predictors of mortality:

- LVEF < 30% (HR 2.98; 95% CI: 1.78–4.99; $p < 0.001$),
- Presence of LGE on MRI (HR 2.41; 95% CI: 1.48–3.91; $p = 0.002$),
- LMNA mutation (HR 3.12; 95% CI: 1.89–5.16; $p < 0.001$),
- NT-proBNP > 4000 pg/mL (HR 2.08; 95% CI: 1.26–3.44; $p = 0.005$).

These findings indicate that combining **genetic profiling, biomarker evaluation, and advanced imaging** substantially enhances prognostic precision compared with conventional parameters alone.

6. Summary of key observations

1. DCM affects predominantly middle-aged males with progressive systolic dysfunction.
2. More than half of patients carry identifiable pathogenic genetic variants.
3. *LMNA* mutations confer a particularly malignant phenotype with arrhythmic and fatal outcomes.
4. MRI-detected fibrosis (LGE) and elevated biomarkers strongly predict mortality and need for transplantation.
5. Integrating genotypic and phenotypic data allows **personalized prognostic modeling**, forming the basis for **precision cardiology** in DCM.

DISCUSSION

The results of this study emphasize that dilated cardiomyopathy (DCM) is not a uniform pathological entity but rather a spectrum of disorders arising from diverse molecular, structural, and functional mechanisms. The integration of clinical observations with genetic analysis has revealed that phenotypic variability in DCM is largely determined by the underlying genotypic architecture and the interaction of environmental modifiers. Genetic mutations, particularly those affecting sarcomeric, cytoskeletal, and nuclear envelope proteins, were shown to play a critical role in disease onset and progression, while secondary triggers such as viral infections, autoimmune reactions, and metabolic disturbances further modulate the phenotype and clinical outcome. The observed heterogeneity among patients underscores the importance of genotype-based risk stratification in clinical management. Patients harboring truncating variants in the *TTN* gene, for instance, exhibited milder left ventricular dysfunction and a relatively favorable prognosis compared with those carrying mutations in *LMNA*, *DSP*, or *FLNC* genes, which are often associated with arrhythmogenic risk and rapid disease progression. This finding supports the growing consensus that molecular profiling should be an integral part of diagnostic algorithms, as it allows clinicians to tailor therapeutic interventions and predict adverse events with greater precision. Moreover, the data demonstrate a significant association between certain genetic profiles and responsiveness to medical therapy. Individuals with non-sarcomeric mutations tended to show limited improvement in left ventricular ejection fraction following standard heart failure treatment, indicating a potential role for gene-specific management strategies. These insights align with emerging concepts of precision medicine, which advocate for a more individualized approach to

cardiomyopathy care based on genetic and molecular signatures. Another critical aspect revealed by this research is the prognostic significance of early and accurate phenotypic characterization. Patients diagnosed during the subclinical phase, particularly those with a known familial predisposition, displayed a slower progression of ventricular remodeling and a lower incidence of malignant arrhythmias. This reinforces the need for routine family screening and longitudinal monitoring, especially in relatives carrying pathogenic variants. The application of next-generation sequencing and advanced imaging modalities such as cardiac MRI with late gadolinium enhancement further enhances diagnostic accuracy and aids in differentiating DCM from phenotypically overlapping conditions such as myocarditis or restrictive cardiomyopathy. From a pathophysiological perspective, the findings suggest that chronic mechanical stress, altered signal transduction, and mitochondrial dysfunction contribute to cardiomyocyte apoptosis and interstitial fibrosis, which collectively drive ventricular dilation and systolic failure. These cellular mechanisms, although genetically mediated, may be partially reversible through early intervention and modulation of molecular pathways. The observed reduction in inflammatory markers among patients receiving targeted anti-fibrotic therapy provides further evidence of the dynamic nature of myocardial remodeling in DCM. In summary, the discussion underscores that the management of dilated cardiomyopathy must evolve beyond conventional symptomatic treatment. A multidisciplinary strategy combining genomics, imaging, and biomarker profiling can substantially improve risk prediction and therapeutic outcomes. The integration of such precision-based methodologies represents the future direction of cardiomyopathy research and clinical practice, ultimately transforming DCM from a largely fatal disease into a manageable chronic condition with improved survival and quality of life.

TABLE 3. CLINICAL AND DEMOGRAPHIC CHARACTERISTICS OF DCM PATIENTS

Parameter	Total (n=212)	Male (n=146)	Female (n=66)	p-value
Age (years, mean $\pm$ SD)	48.6 $\pm$ 12.4	49.1 $\pm$ 12.6	47.5 $\pm$ 11.9	0.238
NYHA Class II (%)	92 (43.4)	63 (43.2)	29 (43.9)	0.912
NYHA Class III (%)	98 (46.2)	67 (45.9)	31 (47.0)	0.884
NYHA Class IV (%)	22 (10.4)	16 (11.0)	6 (9.1)	0.684
LVEF (%)	32.7 $\pm$ 7.4	32.5 $\pm$ 7.2	33.0 $\pm$ 7.8	0.624
LVEDD (mm)	65.8 $\pm$ 8.6	66.2 $\pm$ 8.3	65.0 $\pm$ 9.2	0.312
AF (%)	48 (22.6)	31 (21.2)	17 (25.8)	0.423

Ventricular arrhythmias (%)	40 (18.9)	27 (18.5)	13 (19.7)	0.821
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CONCLUSION

The comprehensive evaluation of dilated cardiomyopathy (DCM) presented in this study reinforces the concept that the disease represents a multifaceted clinical and genetic continuum rather than a single pathological entity. The interplay between genetic mutations, environmental influences, and individual biological variability determines the wide range of phenotypic expressions, clinical courses, and therapeutic responses observed among patients. Identification of key pathogenic variants in genes such as *TTN*, *LMNA*, *DSP*, and *FLNC* underscores the critical role of molecular diagnostics in understanding disease mechanisms, refining classification, and optimizing management strategies. The findings highlight that early genetic screening and phenotypic assessment are fundamental to improving prognosis. Integrating advanced imaging modalities, biomarker analysis, and genomic profiling allows for a more precise prediction of disease trajectory and enables the implementation of targeted, personalized therapeutic approaches. In particular, genotype-guided management has the potential to reduce arrhythmic risk, delay ventricular remodeling, and enhance overall survival rates. Furthermore, this study emphasizes the necessity of a multidisciplinary approach to DCM, involving cardiologists, geneticists, molecular biologists, and rehabilitation specialists. Such collaboration fosters comprehensive care that addresses not only cardiac function but also the broader systemic manifestations and psychosocial dimensions of the disease. The future of DCM management lies in translational research bridging molecular discoveries with clinical practice, ensuring that each patient receives an individualized and evidence-based therapeutic plan. In conclusion, dilated cardiomyopathy exemplifies the complexity of modern cardiovascular medicine, where precision diagnostics and personalized treatment are paramount. Continued advancements in genomics, bioinformatics, and regenerative cardiology promise to transform DCM from a progressive, life-limiting disorder into a manageable chronic condition, improving both longevity and quality of life for affected individuals.

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BIOGEN NANOZARRACHALARNING ORGANIK IFLOSLANTIRUVCHI MODDALARNING PARCHALANISH JARAYONLARIDA KATALITIK FAOLLIGINI O'RGANISH

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Annotatsiya: Mazkur ishda biogen nanozarrachalarning ekologik toza sintez usullari va ularning organik ifloslantiruvchi moddalarning fotokatalitik parchalanishidagi samaradorligi tahlil qilindi. Dorivor o'simlik ekstraktleri asosida metall nanozarrachalar (Ag , Fe_2O_3 , ZnO)ni olish imkoniyatlari o'rganilib, avvalgi tadqiqotlar bilan taqqoslandi. Olingan ilmiy natijalar asosida mualliflar tomonidan biogen nanozarrachalarning kimyoviy va ekologik ahamiyati bo'yicha mustaqil fikr bildirilgan.

Kalit so'zlar: biogen nanozarrachalar, yashil sintez, kataliz, metilen ko'k, fotokataliz, ekologik kimyo.

Kirish: So'nggi yillarda sanoat ishlab chiqarishida organik ifloslantiruvchi moddalar, jumladan, azo-bo'yoqlar, fenollar va pestitsidlarning ko'payishi atrof-muhit muammosini keskinlashtirdi. Ularni yo'qotishning an'anaviy usullari — kimyoviy oksidlanish, adsorbsiya yoki termik parchalanish — yuqori energiya sarfini talab qiladi hamda ikkilamchi ifloslanishga sabab bo'ladi. Shu sababli, yashil kimyo prinsiplari asosida biogen nanozarrachalar sintezi ekologik xavfsiz alternativ yo'l sifatida alohida e'tiborga loyiqdir.

Astonov N.Z. va hamkorlari (2025) tomonidan Codonopsis clematidea ekstrakti yordamida kumush nanozarrachalarining yashil sintezi amalga oshirilgan va ularning antikansirogen xususiyatlari o'rganilgan. Bu ishda o'simlik ekstrakti tarkibidagi fenolik birikmalar kumush ionlarini qaytaruvchi va stabilizator vazifasini bajargani qayd etilgan. Azimova N.A. (2025) esa biotexnologiyaning oziq-ovqat sanoatidagi ekologik qo'llanilishini yoritgan bo'lib, ishlab chiqarishda xavfsiz kimyoviy jarayonlarning ahamiyatini ta'kidlaydi.

Tahliliy qism: Yuqoridagi ikki manbani tahlil qilganda, ularning umumiy jihati — yashil sintezning ekologik afzalliklarini isbotlashdir. Astonovning tadqiqotida asosiy e'tibor nanozarracha sintezi mexanizmiga qaratilgan: o'simlik tarkibidagi flavonoidlar va saponinlar metall ionlarini qaytaruvchi vosita bo'lib xizmat qiladi. Azimova esa bu jarayonlarning sanoatdagi qo'llanilish istiqbollari, ya'ni amaliy

tomonni ko'rsatadi. Demak, birinchi ish "nanozarracha sintezi va ularning fizik-kimyoviy tahlili"ni o'rganadi, ikkinchisi esa "biotexnologik jarayonlarning ekologik xavfsizligi"ni asoslaydi.

Muallif fikri: Bizning fikrimizcha, biogen nanozarrachalarni organik ifloslantiruvchi moddalarning fotokatalitik parchalanishida qo'llash istiqbolli yo'nalishdir. Chunki bunday zarrachalar: ekologik toza usulda sintez qilinadi, yuqori katalitik faollikka ega va iqtisodiy jihatdan arzon. Masalan, kumush yoki temir oksid nanozarrachalari metilen ko'k kabi bo'yoqlarning parchalanishini tezlashtiradi. Bu jarayon yorug'lik ta'sirida oksidlanish-qaytarilish mexanizmi orqali kechadi va natijada ifloslantiruvchi modda CO₂ va H₂O ga parchalanadi.

Xulosa: Taqqoslangan tadqiqotlar shuni ko'rsatadiki, yashil sintez asosida olingan biogen nanozarrachalar ekologik tozalash jarayonlari uchun istiqbolli katalizatorlardir. Ular kimyoviy jihatdan faol, barqaror va toksik bo'lmagan xususiyatlari bilan ajralib turadi. Kelgusida bu nanozarrachalarning reaksiya kinetikasini modellashtirish, UV-Vis spektroskopiya orqali katalitik parametrlarni aniqlash, va sanoat miqyosida sinovdan o'tkazish dolzarb vazifalar sirasiga kiradi.

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ELEKTROLITLAR ARALASHMALARINI IONITLAR YORDAMIDA AJRATISH

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Annotatsiya: Mazkur ilmiy ishda elektrolitlar aralashmalarini ionitlar yordamida ajratishning analitik kimyoda tutgan oʻrni, jarayonning nazariy asoslari va amaliy ahamiyati tahlil qilindi. Ion almashinish mexanizmi, ionitlarning tuzilishi, selektivligi va qayta tiklanish imkoniyatlari koʻrib chiqildi. Shuningdek, bu usulning analitik tahlillarda, xususan, aralash ion eritmalarini aniqlash va komponentlarni tozalashda qoʻllanish istiqbollari yoritildi.

Kalit soʻzlar: elektrolit, ionit, analitik kimyo, ion almashinish, selektivlik, adsorbsiya, ajratish.

Kirish: Analitik kimyoda murakkab aralashmalarni komponentlarga ajratish eng muhim bosqichlardan biridir. Elektrolitlar aralashmalarini ionitlar yordamida ajratish usuli yuqori aniqlik, selektivlik va qayta ishlash imkoniyatlari bilan ajralib turadi. Ion almashinish jarayoni suv tahlilida, metall ionlarini aniqlashda, ekologik monitoring va sanoat chiqindilarini qayta ishlashda keng qoʻllaniladi. Shu sababli, ionitlarning kimyoviy tabiati, ularning ishlash mexanizmi va analitik sohadagi ahamiyatini oʻrganish dolzarb masalalardan biridir.

1-jadval

Kation va anionlarni ionit yordamida ajratish

Ion turi	Ionit turi	Misol ionlar	Qayta tiklash (elutsiya) usuli
Kationlar	Kation ioniti	Na^+ , K^+ , Ca^{2+} , Mg^{2+}	H^+ bilan elutsiya
Anionlar	Anion ioniti	Cl^- , SO_4^{2-} , NO_3^-	OH^- bilan elutsiya

Tahliliy qism: Ion almashinish jarayoni ionit deb ataluvchi polimer yoki noorganik qattiq moddalarning eritmadagi ionlar bilan almashinuviga asoslanadi. Ionitlarning ikki asosiy turi mavjud: kationitlar (musbat ionlarni almashadi) va anionitlar (manfiy ionlarni almashadi). Analitik amaliyotda ion almashinish usuli quyidagi afzalliklari bilan ajralib turadi: – ionlar tarkibini aniq nazorat qilish imkoniyati; – eritmalaridan kerakli komponentni selektiv ajratib olish; – ifloslanishsiz, toza sharoitda ajratish imkoniyati; – ekologik xavfsizlik va ionitlarning qayta ishlashi. Ion almashinish

muvozanati termodinamik qonuniyatlarga asoslanib, harorat, pH, ion kuchi va eritma konsentratsiyasiga bog‘liq holda o‘zgaradi. Amaliy tahlillarda bu jarayon metall ionlarini (masalan, Cu^{2+} , Zn^{2+} , Pb^{2+}) eritmalaridan ajratishda qo‘llaniladi. Ion almashinish usuli ayniqsa suv tahlilida yuqori aniqlik va tejamkorlikni ta’minlaydi.

Mening fikrimcha: Mening fikrimcha, elektrolitlar aralashmalarini ionitlar yordamida ajratish analitik kimyo sohasida eng ishonchli va tejamkor usullardan biridir. Bu jarayon nafaqat aralash ion eritmalarini aniqlash, balki ularni tozalash, qayta ishlash va sifat nazoratida ham katta ahamiyatga ega. Shuningdek, yangi turdagi ionitlar — masalan, nano-tuzilishga ega yoki funksional guruhlar bilan modifikatsiyalangan polimer ionitlar — analitik tahlillarning aniqligini yanada oshiradi. Ionitlar yordamida ajratish jarayonining samaradorligini oshirish uchun eritma muhitining pH darajasini, ionitning zarracha o‘lchamini va ion almashinish kinetikasini chuqur tahlil qilish zarur. Aynan shunday yondashuv analitik kimyo laboratoriyalarida yuqori aniqlikka ega natijalarni olish imkonini beradi.

Xulosa: Yuqoridagi tahlil asosida xulosa qilish mumkinki, elektrolitlar aralashmalarini ionitlar yordamida ajratish analitik kimyo uchun muhim nazariy va amaliy asosga ega. Bu usul yuqori aniqlik, selektivlik va ekologik xavfsizlikni ta’minlaydi. Kelgusida ion almashinish jarayonini avtomatlashtirish, yangi ionit turlarini ishlab chiqish hamda ularni analitik asboblardan integratsiyalash ilmiy izlanishlarning muhim yo‘nalishlaridan biri bo‘lib qoladi.

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FORENSIC MEDICAL EVALUATION OF INJURIES RESULTING FROM ROAD
TRAFFIC ACCIDENTS INVOLVING MODERN VEHICLESJumaniyozov Erkin Hudayberganovich¹Axmedov Zafar Xamroevich¹Abdikarimov Bakhodir Abdikhashimovich²Boltaev Sardor¹*Tashkent State Medical University (Tashkent, Uzbekistan)**Republican Scientific and Practical Center of Forensic Medical Examination*

Introduction: Road traffic accidents (RTAs) represent one of the most significant medico-legal and public health problems worldwide. According to the World Health Organization, RTAs cause over 1.3 million deaths annually and millions of non-fatal injuries. In recent years, the structure of road trauma has changed due to the implementation of advanced automotive technologies, such as passive and active safety systems, energy-absorbing body materials, and improved vehicle ergonomics. These innovations have altered not only the frequency but also the morphology and mechanisms of injuries. Consequently, the forensic medical evaluation of trauma resulting from modern vehicle accidents requires new diagnostic criteria and interpretive approaches that integrate clinical, biomechanical, and morphological perspectives.

Aim: To study the forensic medical characteristics, mechanisms, and diagnostic principles of injuries sustained in road traffic accidents involving modern vehicles.

Materials and Methods: The study included a retrospective and comparative analysis of forensic medical reports of victims injured in RTAs over the past five years. Cases were selected based on the use of vehicles equipped with safety devices such as airbags, seat belts, and reinforced passenger compartments. Injuries were analyzed by localization, type (blunt, combined, compression), and severity according to forensic classification. Additionally, biomechanical assessment of trauma mechanisms and correlation between the injury pattern and vehicle safety elements was performed. Descriptive statistics and comparative analysis were applied to identify consistent trends.

Results: The study demonstrated that modern vehicle safety systems significantly influence the structure of traumatic injuries. While overall mortality has decreased, the profile of injuries has shifted. Airbags frequently cause localized contusions, abrasions, and burns on the face and upper extremities, whereas seat belts are associated with characteristic linear ecchymoses across the thorax and abdomen ("seat belt sign"). Cervical hyperextension and whiplash injuries remain typical for frontal impacts despite airbag deployment. Internal injuries, including cardiac contusions, splenic ruptures, and pulmonary hemorrhages, were observed even in survivors due to deceleration forces. Forensic differentiation between the driver and passengers is possible based on the asymmetry and orientation of injuries, seat belt marks, and contact traces with interior structures.

Conclusion: Forensic medical evaluation of injuries in modern road traffic accidents must take into account the design and operation of contemporary vehicle safety systems. Traditional classifications of mechanical trauma should be revised to include new injury patterns associated with airbags, seat belts, and other passive safety elements. A multidisciplinary approach combining forensic pathology, biomechanics, and vehicle engineering contributes to a more accurate determination of the mechanism and sequence of injuries, the position of victims at the moment of impact, and the overall reconstruction of the event. Such comprehensive evaluation is essential for objective forensic conclusions and for improving preventive strategies in traffic safety and medico-legal practice.

METABOLIC SYNDROME IN PATIENTS WITH TYPE 2 DIABETES MELLITUS: CLINICAL FEATURES, METABOLIC DISORDERS AND APPROACHES TO CORRECTION

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Metabolic syndrome (MS) combined with type 2 diabetes mellitus (T2DM) is one of the most urgent global health problems. It represents a cluster of metabolic and cardiovascular disorders such as abdominal obesity, hypertension, hyperglycemia, dyslipidemia, and insulin resistance [1–3]. The coexistence of MS and T2DM markedly increases the risk of cardiovascular events, nephropathy, and non-alcoholic fatty liver disease. According to IDF and WHO data, the prevalence of MS among diabetic patients reaches 60–80%, emphasizing the need for comprehensive therapeutic strategies to improve metabolic control and prevent complications.

Objective.

To evaluate the clinical and metabolic features of metabolic syndrome in patients with type 2 diabetes and to assess the effectiveness of combined therapy aimed at correcting carbohydrate and lipid metabolism disorders.

Materials and Methods. A total of 120 patients with T2DM and metabolic syndrome (mean age 54.6 ± 7.3 years) were examined. Anthropometric parameters (BMI, waist circumference), blood pressure, fasting glucose, HbA1c, lipid profile, insulin levels, and HOMA-IR index were analyzed. Correlation and regression analyses were used to identify the relationships between metabolic parameters.

Results. Most patients (82%) had abdominal obesity and hyperinsulinemia, 65% had hypertension, and 59% had hypertriglyceridemia. The mean HOMA-IR index was 6.3 ± 1.8 , confirming pronounced insulin resistance. Strong correlations were found between waist circumference and HOMA-IR ($r=0.72$; $p<0.001$), and between triglycerides and HbA1c ($r=0.61$; $p<0.01$). After six months of combined therapy (metformin 1500 mg/day + empagliflozin 25 mg/day), patients demonstrated improved metabolic parameters: body weight reduction by 8.7%, HbA1c decrease by 1.3%, normalization of triglycerides, and increase of HDL cholesterol levels.

Conclusion. Metabolic syndrome in patients with type 2 diabetes is characterized by a high prevalence of insulin resistance, hypertension, and dyslipidemia. Comprehensive treatment including SGLT2 inhibitors and metformin significantly improves metabolic status, reduces cardiovascular risks, and enhances overall therapeutic outcomes. Early diagnosis and personalized management are crucial for preventing long-term complications.

ДЕТСКАЯ КАРДИОЛОГИЯ И ИММУНОЛОГИЯ

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Бухарское областное управление здравоохранения

Цель исследования

Изучить особенности иммунного статуса и иммунных реакций у детей с заболеваниями сердечно-сосудистой системы для выявления взаимосвязи между нарушениями иммунитета и развитием сердечной патологии, а также для определения возможных направлений иммунокорригирующей терапии.

Материалы и методы

Исследование проведено на базе Центральной многопрофильной поликлиники Мирабадского района. В исследование были включены дети в возрасте от 5 до 15 лет с различными сердечно-сосудистыми заболеваниями (врожденные пороки сердца, миокардиты, кардиомиопатии, ревматические поражения). Контрольную группу составили клинически здоровые дети сопоставимого возраста. Клиническое обследование включало сбор анамнеза, физикальное исследование, ЭКГ и эхокардиографию. Лабораторные методы включали общий и биохимический анализы крови, определение уровня иммуноглобулинов (IgG, IgA, IgM), а также оценку клеточного иммунитета (CD3+, CD4+, CD8+, CD19+, CD16/56+ лимфоциты) методом проточной цитометрии. Для оценки воспалительной активности определялись уровни С-реактивного белка и цитокинов (IL-6, TNF- α , IL-10) методом ИФА. Статистическая обработка данных проводилась с использованием программы SPSS; различия считались достоверными при $p < 0,05$.

Результаты и обсуждение

У детей с сердечно-сосудистыми заболеваниями выявлены выраженные изменения иммунного статуса по сравнению с контрольной группой. Отмечено снижение абсолютного и относительного количества Т-лимфоцитов (CD3+, CD4+) и увеличение числа цитотоксических клеток (CD8+), что указывает на развитие вторичного иммунодефицита клеточного типа. Уровни иммуноглобулинов IgG и IgA были снижены, тогда как концентрация IgM и С-реактивного белка повышена, что отражает активацию гуморального иммунного ответа на фоне хронического воспаления. У части пациентов отмечалось повышение провоспалительных цитокинов (IL-6, TNF- α) и относительное снижение IL-10, что свидетельствует о дисбалансе регуляции иммунных реакций. Корреляционный анализ показал, что степень иммунных нарушений напрямую связана с тяжестью сердечной патологии и выраженностью клинических проявлений сердечной недостаточности. Полученные результаты подтверждают участие иммунных механизмов в патогенезе детских кардиологических заболеваний и указывают на необходимость применения иммунокорригирующей терапии в комплексном лечении.

Выводы

Проведённое исследование показало, что у детей с заболеваниями сердечно-сосудистой системы наблюдаются значительные изменения иммунного статуса, выражающиеся в снижении количества Т-лимфоцитов (CD3+, CD4+) и повышении уровня цитотоксических клеток (CD8+), что свидетельствует о формировании вторичного иммунодефицита клеточного типа. Нарушение баланса между клеточным и гуморальным иммунитетом проявляется повышением концентрации IgM и снижением IgG и IgA, что отражает хроническую антигенную стимуляцию и длительный воспалительный процесс, характерный для детской кардиологической патологии. Повышенные уровни провоспалительных цитокинов (IL-6, TNF-α) и снижение противовоспалительного IL-10 указывают на дисбаланс цитокиновой регуляции, который способствует прогрессированию воспаления и усугублению сердечной дисфункции. Установлена прямая зависимость между выраженностью иммунных нарушений и степенью сердечной недостаточности, что подтверждает ключевую роль иммунной системы в патогенезе кардиологических заболеваний у детей. Результаты исследования подтверждают целесообразность включения иммуномодулирующих и противовоспалительных средств в комплексную терапию детей с сердечно-сосудистыми заболеваниями. Это может повысить эффективность лечения, улучшить прогноз и снизить риск развития хронической сердечной недостаточности. Проведённый анализ подчёркивает необходимость регулярного мониторинга иммунологических показателей у пациентов детского возраста с кардиопатологией для раннего выявления нарушений и своевременной коррекции терапии.

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α -LINOLENIK KISLOTA TUZILISHI VA BIOLOGIK XOSSALARI

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Annotatsiya: Mazkur maqolada α lenolenik kislotasini tuzilishi va biologik xossalari taxlil qilingan. Asosiy e'tibor Alex Sala Vila va Ram Reifen, Anna Karlinsky, Aliza H Stark, Zipi Berkovich, Abraham Nyskalar tomonidan olib borilgan tadqiqot natijalarini taxlil qilishga qaratilgan. Alex Sala- Vila α linolenik kislota o'simlik yog' kislota, yurak- qon tomir kasalliklari va kognitiv tizimiga ta'siri haqida o'rgangan bo'lsa Ram Reifen, Anna Karlinsky, Aliza H Stark, Zipi Berkovich, Abraham Nyskalar α linolenik kislota [to'yinmagan yog' kislota] istemol qilish yallig'lanishli ichak kasalliklarida yallig'lanishga qarshi vosita ekanligini o'rgangan. Tadqiqotlar taqqoslanishi shuni ko'rsatadiki alfa linolenik kislota [to'yinmagan yog' kislota] bu omega 3- sinifdagi muxim o'simlikka asoslangan ko'p to'yinmagan yog'li kislota xisoblanadi. U organizm uchun zarur bo'lgan yog'li kislota, uni o'simlik yog'lari yong'oqlar va urug'lar kabi oziq - ovqat manbalaridan olish mumkin. Maqolada biologik ahamiyati foydali manbalari ham yoritilgan.

Kalit so'zlar: Alfa linolenik kislota [ALA], Xolesterolin LDL, HDL, TRombotsitlar, Proteoin, Antioksidant, To'yinmagan yog' kislota, AMD, giperlipidemiya

Taxliliy qism

Alex Sala- Vila Alfa linolenik kislota o'simlik asosidagi uzun zanjirli n-3 yog' kislotalarining sog'lik uchun foydali bo'lgan ALA kardio metabolik kasalliklari va kognitiv qobiliyatga tasirini yaxshiroq tushunishga qiziqish katta bo'lgan. ALA uchun asosan uning asosiy oziq ovqat manbalariga yani [yong'oq va zig'ir urug'I] asoslangan dalillar ko'payib bormoqda, ammo bu bizning uzun zanjirli n-3 yog' kislotalarini tushunishimidan orqada qolmoqda. Kuzatuvlar taxlillari shuni ko'rsatadiki parxezdagi ALA miqdorini oshirish umumiy yurak qon tomir kasalliklar xavfini 10 foizga va o'limga olib keladigan koronar yurak kasalligi xavfini 20 foizga kamaytirish bilan bog'liq. ALA tasirini maxsus baxolash uchun moljallangan Alpha Omega sinovi faqat foyda tentetsiyasini ko'rsatdi. VA qo'shimcha tadqiqotlar shuni ko'rsatadiki ko'plab surunkali kasalliklarni kamaytirish uchun kuchli dalillarga asoslangan parhez tavsiyalarini berish uchun yaxshiroq pazitsiyaga ega bo'lishini aytib o'kan.

Ram Reifen, Anna Karlinsky, Aliza H Stark, Zipi Berkovich, Abraham Nyska tadqiqotlari shuni ko'rsatadiki n-3 to'yinmagan yog'li kislotalarni istemol qilish

yallig'lanishli ichak kasalliklarida himoya rolini o'ynaydi. ammo ALA BOY O'SIMLIK moylaridan foydalanish keng miqyosida o'rganilmagan. ushbu tadqiqotlar maqsadi ikki xil PUFA MANBALARI baliq va o'simlik moylarining tasirini tajriba kolitining ikkita hayvon modelida sinab ko'rish va PUFA BILAN BOYITILGAN DIETALAR YALLIG'lanish holatini yaxshilash mumkinligini aniqlash edi. kalamushlar 3 hafta davomida makkajuxoro baliq yogi bilan boy ovqatlar ishtirokida ovqatlanirdi. songra ichimlik suviga tekstrant Na_2SO_4 qo'shilishi yoki 2,4,6 tribenzol sulfon kislotasini yuborish orqali kolit qoshgatildi. Bkiz kolletik kalamishlar makkajoxori va baliq yog'I bilan solishtirganda adachaye yo'I bilan oziqlangan kalamushlarning yallig'lanish reaksiyasi pastroq ekanligini gistalogik tuzatishni yaxshilaganligini va shilliq qavatida kamroq nikrotin shikastlanishga ega ekanligini kuzatdi.

Mening fikrimcha

Alfa linolenik kislota tarkibi $C_{18}H_{30}O_2$ uchta bog' mavjud

Qanday ishlaydi - organizmda ALA metabolizatsiya qilinadi va sog'liq uchun foydali bo'lgan EPA [Eikozapentaenoik kislota] va DHA [dokosahesanoik kislota] ga aylanadi.

Foydaliligi:

Yallig'lanishni kam,aytiradi yurak qon tomir kasalliklari havfini kamaytiradi miyanning soglom rivojlanishiga yordam beradi.

Manbalari:

Zaytun moyi Kamda moyi Chigit moyi Zig'ir urug'I moyi Chandir urug'I moyi yashil bargli sabzavotlarda ko'p uchraydi.

Insonning ovqatlanishi va salomatligida muxim ro'l o'ynaydi. Kundalik ovqatlanishga tasirini o'rganadi

ALA endogen tarzda sintez qilib bo'lmaydi va uni parxez orqali olish kerak.

Dokosooksenoik kislota [DHA] miyya rivojlnishi va parvarishiga xissa qo'shadi. ALA kuchli Antiosindant va yallig'lanishga qarshi xususiyatga ega. U erkin radikallarni tozalash va xujayra shikastlanishiga va turli kasalliklarning boshlanishiga katta xissa qo'shadigan oksidlovchi stresni kamaytiruvchu xususiyatiga ega

ALA ning bialogik xususiyatlari

Antioksidant va yallig'lanishga qarshi xususiyatlar

Ko'rish ximoyasi

Giperlipedemiyani davolash

Trombos kasalliklarining oldini olish

Xomladorlik va laktatsiya davrida qo'llab quvvatlash kabi xususiyatlarga ega.

Tavfsiyalar:

Bargli ko'katlarni quchoqlang proteyn manbalarigizni o'rganing zig'ir urug'i yoki chiya urug'ini seping yoki gazak sifatida bir xovuch yong'oqdan zavqlaning. Sovuq siqilgan yog'larni istemol qiling. Oziq moddalarni saqlab qolish uchun uni isitilmagan xolda istemol qiling.

Alfa linolenik kislota inson salomatligini saqlashda muxim ro'l o'ynaydigan oziq moddalardir.

Foydalanilgan adabiyotlar

1. α -Linolenic acid (ALA) is an anti-inflammatory agent in inflammatory bowel disease

Авторы

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2. Impact of α -Linolenic Acid, the Vegetable ω -3 Fatty Acid, on Cardiovascular Disease and Cognition

Авторы

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KOMPLEKS BIRIKMALARNING ELEKTRON TUZILISHI VA KOORDINATSION SONI

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Annotatsiya: Ushbu ilmiy ishda kompleks birikmalarning elektron tuzilishi va koordinatsion soni tahlil qilingan. Elektron tuzilish komplekslarning barqarorligi, reaktivligi hamda fizik kimyoviy xossalriga qanday ta'sir ko'rsatishi ilmiy jihatdan yoritilgan. Koordinatsion sonning markaziy son atrofida joylashgan ligandlar sonini belgilashdagi o'rni, shuningdek komplekslarning geometrik tuzilishiga ta'siri ham ko'rib chiqilgan. Tadqiqot natijalari noorganik kimyo va materialshunoslik sohalarida amaliy ahamiyat kasb etadi.

Kalit so'zlar: Kompleks birikma, elektron tuzilish, koordinatsion son, ligand, markaziy ion, geometrik tuzilma.

Kirish: Kompleks birikmalar kimyoning noorganik sohasida muhim o'rin tutadi. Ularning elektron tuzilishi va koordinatsion soni moddalar xossalari, reaksiyaga kirishish qobiliyatini hamda barqarorligini belgilovchi asosiy omillardandir. Koordinatsion son markaziy atomga nechta ligand bog'lana olinishini ko'rsatadi, bu esa kompleksning geometrik va kimyoviy tuzilishini aniqlashda muhim ahamiyatga ega. Kompleks hosil qiluvchi sifatida ko'proq o'tish metallarning (d- va f-elementlar) kationlari ishtirok etadi.

Tahliliy qism: Kompleks birikmalarda metall ion yoki atomi akseptor, ligand tarkibidagi taqsimlanmagan elektron juftiga ega atom donor atomlarining soniga ko'ra ligandlar monodentat (1 ta donor atom), bidentat (2 ta donor atom) va polidentat (>2 ta donor atomlari) ligandlarga bo'linadi. Luis kislotalarida (markaziy atom) bo'sh orbitalar mavjud bo'ladi. Luis asoslarida (ligandlarda) taqsimlanmagan elektron juftlari bo'ladi.

Ligandlarning markaziy atomga bog'lanishi kompleks birikma xossalriga kuchli ta'sir qiladi. Koordinatsion son markaziy ion bilan to'g'ridan-to'g'ri bog'langan atomlar soni bo'lib, kompleksning geometrik shaklini aniqlaydi.

Koordinatsion son	Molekula shakli	Gibridlanish	Misol
2	Chiziqli	sp	$[\text{Ag}(\text{NH}_3)_2]^+$
4	Tekis kvadrat	sp^2d	$[\text{PtCl}_2(\text{NH}_3)_2]$
6	Oktaedrik	sp^3d^2	$[\text{Co}(\text{H}_2\text{O})_6]^{3+}$

Koordinatsion son kompleksning barqarorligi, rang berish xususiyati, magnit xossalari va kimyoviy faolligiga bevosita ta'sir qiladi. Shuning uchun komplekslarning elektron tuzilishini bilish ularni sintetik kimyo, bioorganik kimyo va kataliz sohalarida samarali qo'llash imkonini beradi.

Mening fikrimcha: Mening fikrimcha kompleks birikmalarning elektron tuzilishini chuqur o'rganish ularning kimyoviy faoliyatini yanada yaxshiroq tushunish imkonini beradi. Bu borada koordinatsion son tushunchasi asosiy o'rin tutadi, chunki u kompleksning fazoviy shaklini, barqarorligini va ligandlararo ta'sirini belgilaydi. Shuningdek, bunday bilimlar yangi komplekslar sintezini rejalashtirish, ulardan katalizator yoki biologik faol modda sifatida foydalanish imkonini beradi.

Zamonaviy ilm-fan sohalarida ayniqsa nano va bioorganik kimyoda bu bilimlarning ahamiyati yanada kattadir.

Xulosa: Xulosa qilib aytganda, kompleks birikmalarning elektron tuzilishi va koordinatsion soni ularning kimyoviy tabiatini, barqarorligini hamda qo'llanish sohasini belgilovchi eng muhim omillardandir. Bu tushunchalarni chuqur o'rganish orqali kimyoviy jarayonlarni boshqarish va yangi samarali birikmalar yaratish mumkin. Kompleks birikmalar haqidagi ilmiy izlanishlar kimyo fanining rivojida katta o'rin tutadi.

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KAEMPFEROLNING TIBBIYOTDA QO‘LLANILISHI VA AHAMIYATI

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Annotatsiya: Kaempferol — tabiiy flavonoid birikma bo‘lib, u o‘simliklarning bargi, meva va sabzavotlarida uchraydi. Ilmiy tadqiqotlar kaempferolning antioksidant, yallig‘lanishga qarshi, immun tizimni muvozanatlashtiruvchi va saratonga qarshi xususiyatlarini isbotlagan. U yurak, jigar, asab, immun va metabolik tizimlarda foydali biologik ta’sir ko‘rsatadi. Ushbu maqolada kaempferolning tibbiyotdagi ahamiyati va qo‘llanish imkoniyatlari ilmiy dalillar asosida tahlil qilinadi.

Kalit so‘zlar: Kaempferol, flavonoid, immun tizimi, yallig‘lanish, saraton, antioksidant, biofaol modda.

Kirish: Tabiiy biofaol moddalar so‘nggi yillarda tibbiyotda katta qiziqish uyg‘otmoqda. Shulardan biri — kaempferol bo‘lib, u choy, olma, karam, apelsin, uzum, qulupnay kabi o‘simliklarda mavjud. Kaempferol antioksidant, yallig‘lanishga qarshi va immunomodulyator ta’sirlari bilan ajralib turadi. Ko‘plab ilmiy izlanishlar uning yurak- qon tomir, yallig‘lanishli, saraton va metabolik kasalliklarda foydali ta’sir ko‘rsatishini tasdiqlagan. Shu sababli, kaempferol zamonaviy tibbiyotda tabiiy, xavfsiz modda sifatida qaralmoqda.

Tahliliy qism: Yallig‘lanishga qarshi ta’siri- eksperimental natijalar kaempferol artrit, o‘pka va teri yallig‘lanishlarida og‘riq va shishni 40–60 % gacha kamaytirishini ko‘rsatgan.

Yallig‘lanish jarayonining fiziologik me’yorga qaytishiga yordam beradi. Shu sababli, kaempferol tabiiy yallig‘lanishga qarshi vosita sifatida farmakologiyada muhim ahamiyatga ega.

Antioksidant xususiyatlari-kaempferol erkin radikallarni neytrallab, hujayralarni oksidlovchi stressdan himoya qiladi. U superoksid dismutaza, katalaza va glutation peroksidaza fermentlarining faolligini oshiradi, bu esa DNK va hujayra membranalarini himoya qiladi. Tajribalarda kaempferol qo‘llanganda malondialdegid darajasi 35–45 % ga kamaygan. Antioksidant ta’siri tufayli u yurak, jigar va asab to‘qimalarini shikastlanishdan saqlaydi, organizmdagi qarish jarayonlariga qarshi himoya qiladi. Saratonga qarshi ta’siri-kaempferol o‘sma hujayralarining o‘sishini sekinlashtiradi. Tadqiqotlarda bu modda jigar, o‘pka, oshqozon hujayralarida o‘sma o‘sishini 40–70 % gacha kamaytirgani aniqlangan. Shuningdek, u yangi qon tomir hosil bo‘lishini to‘xtatib, o‘smalarning oziqlanishini cheklaydi. Bu ta’sir tufayli kaempferol kimyoterapiya preparatlari samaradorligini oshirishi mumkin. Yurak, jigar va metabolik tizimlarga ta’siri: Kaempferol yurak mushaklarini erkin radikallardan himoya qiladi, xolesterin oksidlanishini kamaytiradi va qon tomir devorlarini mustahkamlaydi. Jigar to‘qimalarida u toksik moddalarning to‘planishiga to‘sqinlik qiladi. Diabet modelida esa kaempferol glyukoza darajasini pasaytirgan, insulin sezuvchanligini oshirgan va yog‘ almashinuvini me’yorga keltirgan.

Mening fikrimcha: Kaempferol — hozirgi va kelajak tibbiyotining eng istiqbolli tabiiy moddalardan biridir.

Mening fikrimcha, uning ahamiyati shundaki, u bir vaqtning o‘zida bir nechta tizimga foydali ta’sir ko‘rsatadi: immun tizimni muvozanatlashtiradi, yallig‘lanishni kamaytiradi, hujayralarni oksidlovchi

stressdan himoya qiladi va o'sma jarayonini sekinlashtiradi. Bu xususiyatlar uni faqat bitta kasallik emas, balki ko'p sababli surunkali kasalliklarda (diabet, artrit, saraton)da qo'llash imkonini beradi. Shuningdek, kaempferolning toksikligi juda past, bu esa uni uzoq muddatli terapiya uchun mos qiladi. Ayni paytda uning asosiy kamchiligi — biologik so'rilish darajasining pastligi. Shu sababli, kelajakdagi ilmiy ishlar kaempferolni nanokapsula, bioaktiv shakllarda yetkazib berish texnologiyalariga yo'naltirilsa, bu modda tibbiyotda amaliy qo'llanilishi mumkin bo'lgan tabiiy dori vositasiga aylanadi. Menimcha, kelgusida kaempferol asosida yaratiladigan preparatlar sintetik yallig'lanishga qarshi dorilar va antioksidantlar o'rnini qisman bosishi, ularning nojo'ya ta'sirlarini kamaytirishi mumkin.

Xulosa: Kaempferol tabiiy manbali flavonoid bo'lib, u yallig'lanishni kamaytiruvchi, antioksidant, immun tizimni muvozanatlashtiruvchi va o'sma hujayralarini yo'qotuvchi xususiyatlarga ega. Ilmiy faktlar bu moddaning yurak, jigar, immun va metabolik tizimlarda foydali ta'sirini ko'rsatgan. U tibbiyotda keng qo'llanish salohiyatiga ega bo'lib, kelajakda dori vositalar yaratishda asosiy tabiiy komponentlardan biri bo'lishi kutilmoqda.

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ТУЛКИ МОЯК (*Balanites aegyptiaca*) ЎСИМЛИГИНИНГ ТИББИЙ АҲАМИЯТИ ВА ХИМИЯВИЙ ТАРКИБИ УРГАНИШ.

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Кириш: Бугунги кунда табиий манбалардан олинадиган шифобахш моддаларни ўрганиш тиббиёт ва фармация соҳасида муҳим йўналишлардан бири ҳисобланади. Марказий Осиё минтақасида кенг тарқалган “тулки мояк” (*Balanites aegyptiaca* L. Delile) номли ўсимлик халқ табobatiда қадимдан жигар, диабет, ревматизм ва эркак кучсизлиги каби касалликларни даволашда ишлатилиб келинган. Унинг мевалари ва уруғларидан тайёрланган препаратлар юқори биологик фаолликка эга бўлиб, замонавий фармакологияда катта илмий қизиқиш уйғотмоқда.

Мақсад: *Balanites aegyptiaca* ўсимлигининг асосий биологик фаол моддаларини, уларнинг фармакологик хусусиятларини ҳамда тиббий қўлланилиш имкониятларини ўрганиш.

Материал ва усуллар: Тадқиқотда халқаро манбалар, илмий журналлар ва монографиялар таҳлил қилинди. Ўсимликнинг мевалари, уруғлари ва ёғидан ажратиб олинган биологик моддаларнинг таъсири ҳақидаги лаборатория маълумотлар таҳлил қилинди. Асосий усуллар сифатида фитохимик таҳлил, хроматографик усуллар, ҳамда экспериментал фармакология тадқиқотлари натижалари қўлланилди.

Натижалар ва муҳокама: Тадқиқот натижалари шуни кўрсатдики, *Balanites aegyptiaca* (тулки мояк) ўсимлиги мевалари, уруғлари ва ёғида биологик фаол моддаларнинг кенг спектри мавжуд. Фитохимик таҳлиллар натижасида сапонинлар, флавоноидлар, стероидлар, алкалоидлар ва тритерпеноидлар аниқланди. Хроматографик таҳлил усуллари орқали асосий биологик фаол бирикмалардан баланитин ва диосгенин ажратиб олинди.

Экспериментал фармакология тадқиқотлари ушбу бирикмаларнинг антибактериал, антиоксидант ва гипогликемик таъсирга эгалигини тасдиқлади. Айниқса уруғ ёғининг антиоксидант фаоллиги юқори бўлиб, у эркин радикалларни нейтраллаштириш қобилияти билан ажралиб турди. Шунингдек, сувли экстрактлар ҳайвонларда қон шакар миқдорини пасайтиришда самарали таъсир кўрсатди. Олинган маълумотлар *Balanites aegyptiaca* ўсимлигидан олинадиган биологик моддаларни табиий терапевтик восита сифатида қўллаш имкониятини кўрсатди. Бу эса келгусидаги клиник тадқиқотлар учун илмий асос яратади.

Химиявий таркиби:

Balanites aegyptiaca меваси ва уруғларида қуйидаги моддалар аниқланган:

Сапонинлар (баланитин А, В, С) — тритерпеноид табиатли бирикмалар бўлиб, гипогликемик ва гепатопротектор таъсир кўрсатади.

Флавоноидлар (кверцетин, кампферол) — кучли антиоксидантлар бўлиб, яллиғланиш жараёнларини камайтиради.

Стероидлар (β-ситостерол, стигмастерол) — қон липидларини барқарорлаштиради.

Ёғ кислоталари (олеин, линол, пальмитин) — юрак-қон томир тизимига фойдали.

Минераллар: Са, Zn, Fe, Mg, К.

Фармакологик таъсирлар

Гипотопротектор: жигар хужайраларини химоя қилади ва қайта тикланишини тезлаштиради.

Антидиабетик таъсир: қон глюкозасини пасайтиради, инсулин фаоллигини оширади.

Антибактериал ва яллиғланишга қарши: *Staphylococcus aureus*, *E. coli* каби бактерияларга қарши таъсир қилади.

Антиоксидант таъсир: эркин радикалларни нейтраллаштириб, қариш жараёнини секинлаштиради. Эркакларда потенцияни кучайтиради ва гормонал мувозанатни яхшилайд.

Хулоса

Balanites aegyptiaca — юқори биологик фаолликка эга бўлган табиий манба ҳисобланади. Унинг таркибидаги сапонинлар, флавоноидлар ва стероллар организмнинг иммун тизимини мустаҳкамлайди, жигар фаолиятини яхшилайд ва диабетда самарали таъсир кўрсатади. Шунинг учун ушбу ўсимликни асосида маҳаллий фитопрепаратлар ишлаб чиқиш илмий ва амалий жиҳатдан истиқболли йўналиш ҳисобланади.

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THEORETICAL ASPECTS AND INTERACTIVE METHODS OF TEACHING FINANCIAL ACCOUNTING.

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Keywords: financial accounting, digital economy, interactive methods of teaching, accounting functions, modular teaching, Uzbekistan.

INTRODUCTION

In the digital economy, accounting plays a very important role in the organization, control and management of material production in the process of managing and distributing the funds of an entity. It is necessary to continuously monitor all processes of an enterprise's activity. Observing, measuring and recording certain events occurring in the economic activity of an enterprise is a quantitative reflection of its activities. This is the main content of accounting. The purpose of financial accounting is to provide users with complete and reliable financial and accounting information in a timely manner. Any management system needs an appropriate information supply system. Accounting is one of the most important tools for collecting, summarizing and processing information in society.

1. The development of financial accounting and its priorities.

In order for an enterprise to be able to timely and correctly take into account and interpret new facts and events, and to develop sustainably on this basis, it must have an effective system of data collection and processing. [1].

To successfully achieve this goal, accounting must solve the following tasks:

- timely registration of business transactions in documents that have occurred at the enterprise;
- formation of complete and reliable information on the status and movement of assets, property rights and obligations in accounting accounts;
- generalization of accounting information for the purpose of effective management;
- timely preparation and submission of financial statements to the relevant authorities.

At the same time, it is also necessary to classify the functions of accounting. Today, the following can be included in the functions of accounting (Figure 1).



Figure 1. Functions of financial accounting.

2. Regulatory and legal framework of accounting in the Republic of Uzbekistan.

In practice, the regulatory and legal basis of accounting in Uzbekistan is:

- Laws, Codes, Presidential Decrees, Government Resolutions.
- Accounting Standards, Regulations and Instructions developed by the Ministry of Finance, Instructions, Procedures and Explanatory Letters issued by the State Tax Committee.
- Instructions, methodological guidelines, explanatory letters developed by other ministries and government agencies.

- Internal regulatory documents that reflect the accounting policies of enterprises.

The Law "On Accounting" is a key element of the accounting reform, establishing a unified accounting procedure for all enterprises, institutions and organizations of various forms of ownership, setting requirements for national accounting standards and providing for the basic principles of the accounting system in the Republic of Uzbekistan. The purpose of this Law is to regulate relations in the field of organization, maintenance and reporting of accounting [2].

3. Interactive teaching methods used in modular teaching of financial accounting.

The following interactive learning methods can be used in the modular teaching of the subject "Financial Accounting":

1. "Mind Attack" strategy
2. "Blis-Query" method
3. "Bumerang" strategy
4. "Venn Diagram" graphic organizer
5. "Video Finding" strategy
6. "One Period" strategy
7. "Debate" method
8. "Writing" strategy
9. "Schedule" graphic organizer
10. "Insert" graphic organizer
11. "Case-Study" method. [3].

There are several types of credit systems in the world's higher education system:

ECTS - European Credit Transfer System;

USCS - American credit system;

CATS - British credit system;

UCTS - Asian and Pacific credit system.

4. Conclusion and Recommendations

The effectiveness of the education system is directly ensured by the level of teachers, student needs, the content of educational literature, and the infrastructure aimed at the formation of independent learning. Therefore, the training of advanced personnel, increasing their competitiveness in accordance with the requirements of the labor market, and the cultivation of creatively thinking specialists are closely related to the educational process established in educational institutions.

The introduction of the credit-module system in higher education will improve the quality of education, ensure transparency, eliminate corruption, reveal the true knowledge of the student, and create a basis for the student to independently study and work on himself.

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TIJORAT BANKLARI AKTIVLARINING DAROMADLILIGIGA TA'SIR QILUVCHI OMILLAR

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ANNOTATSIYA

Mazkur maqolada tijorat banklari aktivlarining daromadliligiga ta'sir etuvchi asosiy omillar tahlil qilingan. Xususan, makroiqtisodiy barqarorlik, inflyatsiya darajasi, investitsion muhit, qimmatli qog'ozlar bozori rivoji, kredit siyosati va kredit portfelining diversifikatsiya darajasi banklar daromadliligini belgilovchi muhim omillar sifatida ko'rib chiqiladi. Shuningdek, Prezidentning 2022–2026 yillarga mo'ljallangan taraqqiyot strategiyasida belgilangan vazifalarning banklarning moliyaviy barqarorligiga ko'rsatadigan ta'siri tahlil etiladi. Tadqiqot natijalariga ko'ra, tijorat banklari aktivlaridan olinadigan daromadlilikni oshirish uchun kredit portfelini optimal boshqarish, risklarni kamaytirish va aktivlar tarkibini diversifikatsiya qilish zarur degan xulosaga kelindi.

Kalit so'zlar

tijorat banklari, aktivlar daromadliligi, kredit portfeli, diversifikatsiya, moliyaviy barqarorlik, inflyatsiya, qimmatli qog'ozlar bozori, investitsion kreditlar, risklarni boshqarish, foiz daromadi.

O'zbekiston Respublikasi Prezidentining 2022–2026 yillarga mo'ljallangan **“Yangi O'zbekistonning taraqqiyot strategiyasi”** to'g'risidagi farmonida makroiqtisodiy barqarorlikni ta'minlash bank tizimining moliyaviy mustahkamligini oshirishda muhim omil sifatida qayd etilgan. Xususan, inflyatsiya darajasini **5 foizdan yuqori bo'lmagan** ko'rsatkichda ushlab turish orqali tijorat banklarining milliy valyutadagi aktivlarining qadrsizlanish xavfi pasayadi. Bu esa, bir tomondan, banklar tomonidan kredit resurslari qiymatini kamaytirish imkonini yaratadi, ikkinchi tomondan esa, kreditlarning qaytarilish ko'rsatkichlarining yaxshilanishiga hamda kredit operatsiyalaridan olinadigan foiz daromadlarining ortishiga olib keladi.

Shuningdek, iqtisodiyotga investitsiyalar oqimini kengaytirish tijorat banklarining **investitsion kreditlar** hajmini oshiradi. Mamlakatda qimmatli qog'ozlar bozorining rivojlanishi esa banklarning qimmatli qog'ozlar bilan bog'liq aktiv, passiv hamda savdo-vositachilik operatsiyalari hajmini kengaytiradi. Natijada:

- tijorat banklarining **foiz va dividendlar** ko'rinishidagi daromadlari oshadi;
- yuqori likvidli qimmatli qog'ozlar (jumladan, Markaziy bank va Hukumat obligatsiyalari) portfeli kengaygani sababli banklarning **joriy likvidligi mustahkamlanadi**.

Bu holat O'zbekiston Respublikasi Markaziy bankining likvidlilik bo'yicha prudensial talablariga to'liq mos keladi. Chunki mazkur qimmatli qog'ozlar **yuqori likvidli aktivlar** sifatida e'tirof etiladi va bankning likvidlik ko'rsatkichlarida ijobiy ta'sir ko'rsatadi.

Quyidagi jadval ma'lumotlari orqali AT “Asakabank” kredit portfelining tarmoq tarkibiga e'tibor qaratamiz va xulosa qilamiz.

1-jadval

AT “Asakabank” kredit portfelining tarmoq tarkibi, foizda¹

Tarmoqlar	2019 y.	2020 y.	2021 y.	2022 y.	2023 y.
Sanoat	62,8	68,2	70,6	67,2	63,9
Qishloq xo‘jaligi	6,8	5,5	4,3	4,0	3,6
Transport va kommunikatsiya	1,2	1,9	1,8	1,8	1,7
Qurilish	1,2	1,2	1,3	1,0	1,0
Savdo va umumiy ovqatlanish	3,9	4,4	4,9	4,6	3,4
Moddiy-texnika ta‘minoti	0,0	0,0	0,0	0,0	0,0
Uy-joy kommunal xo‘jaligi	0,5	0,4	0,4	0,3	0,4
Boshqa tarmoqlar va sohalar (shu jumladan jismoniy shaxslar)	23,6	18,4	16,7	21,1	27,0
Jami	100	100	100	100	100

1-jadval ma‘lumotlaridan ko‘rinadiki, Asakabank kredit portfelining diversifikatsiya darajasi 2019-2023 yillarda juda past bo‘lgan. Chunki, iqtisodiyotning sanoat tarmog‘iga berilgan kreditlarning Asakabankning kredit portfelidagi ulushi tahlil qilingan davr mobaynida 62 foizdan yuqori bo‘lgan. Holbuki, xalqaro bank amaliyotida umum e‘tirof etilgan mezonga ko‘ra, tijorat banklari kreditlarining 25 foizdan ortiq qismini bitta tarmoq korxonalariga berilishi maqsadga muvofiq emas.

1-jadval ma‘lumotlaridan ko‘rinadiki, iqtisodiyotning tayanch tarmoqlari bo‘lgan qishloq xo‘jaligi, transport va kommunikatsiya, qurilish tarmoqlariga berilgan kreditlar Asakabankning kredit portfelida juda kichik salmoqni egallaydi.

Xulosa va takliflar (o‘zgartirilgan ko‘rinish)

1. **Kredit portfeli tuzilmasining yetarlicha diversifikatsiya qilinmaganligi** tijorat banklari faoliyatida kredit riskining yuqori darajada saqlanib qolishiga sabab bo‘lmoqda. Kreditlarning ma‘lum tarmoqlar yoki mijozlar guruhlari bo‘yicha to‘planib qolishi potentsial zararlarni oshiradi.

2. Tijorat banklarida kredit operatsiyalarining **daromadlilik–xavflilik nisbatini optimallashtirish** maqsadida kredit portfelining moliyaviy xavfsizlik darajasini baholovchi **ko‘rsatkichlar tizimini shakllantirish** maqsadga muvofiq. Bunda:

- kreditlarning o‘rtacha rentabellik darajasi,
 - kredit portfelining sektoral diversifikatsiya ko‘rsatkichlari,
 - kreditlarning tasniflanish darajasi,
 - kechiktirilgan kreditlar ulushi
- kabi ko‘rsatkichlarga alohida e‘tibor qaratilishi kerak.

3. Banklar uchun **risklarni oldindan baholashga asoslangan kredit siyosatini takomillashtirish**, kredit oluvchilarning moliyaviy holatini tahlil qilishda zamonaviy scoring texnologiyalaridan foydalanish daromadlilikni oshirishning muhim shartidir.

¹Jadval muallif tomonidan AT Asakabankning yillik xisobotlari ma‘lumotlari asosida tuzilgan.

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INSON MIKROBIOMASI VA HELICOBACTER PYLORI O'RTASIDAGI ALOQA

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Dolzarbli: Mikrobioma ma'lumotlarining integratsiyasi okkultiv kasalliklarni aniqlash, ilgari yashirin patologiyalarni ochish va erta aralashuv imkoniyatlarini yaratishda istiqbolli imkoniyatlarni namoyish etdi. Ushbu innovatsion kashfiyotlar yangi terapevtik strategiyalar va inson mikrobiomasining o'zaro bog'liqligi va umumiy salomatligini chuqurroq tushunish uchun yo'l ochadi.

Maqsad: *Helicobacter pylori* infeksiyasining inson mikrobiotasiga ta'siri va ularning o'zaro bog'liqligini ilmiy manbalar asosida tahlil qilish hamda bu aloqaning gastrointestinal kasalliklar patogenezidagi ahamiyatini aniqlashdir.

Tadqiqodning material va metodlari. *Helicobacter pylori* infeksiyasi va inson mikrobiotasi o'rtasidagi o'zaro ta'sirni tahlil qilish uchun ilmiy adabiyotlar, zamonaviy metagenomik va mikrobiologik tadqiqotlar ma'lumotlari tahlil qilindi. Ma'lumotlar Google Scholar, PubMed va boshqa xalqaro bazalardan olingan ilmiy maqolalar asosida tahliliy-taqqoslov usulida o'rganildi.

Olingan natijalar. *Helicobacter pylori* - bu odamlar bilan birgalikda rivojlangan bakteriya va uning inson oshqozonida lokalizatsiya oshqozon yarasi va oshqozon saratoni kabi eng keng tarqalgan kasalliklar bilan bog'liq. Shu bilan birga, qizilo'ngach adenokarsinomasi, gastroezofagial reflyuks kasalligi va yallig'lanishsiz ichak kasalliklari kabi boshqa kasalliklarga qarshi himoya roli haqida ko'proq dalillar mavjud.

1982 yilda kashf etilganidan beri *Helicobacter pylori* (*H. pylori*) surunkali faol gastritning asosiy sababi ekanligi va oshqozon yarasi kasalligi, oshqozon adenokarsinomasi va B hujayrali oshqozon limfomasi bilan yaqin aloqada ekanligi ko'rsatildi. *H. pylori* infeksiyasini olib tashlash uchun sitokin ishlab chiqarish kabi xost immun reaksiyasi zarur bo'lsa-da, u gastrit rivojlanishini, shuningdek *H. pylori* mono qatlam o'sishini inhibe qiluvchi surunkali immun reaksiyasini keltirib chiqaradi. *H. pylori* infeksiyasi yo'q qilinmasdan, oshqozon yarasi, saraton va boshqa surunkali kasalliklarga o'tadi. *H. pylori* ning lipopolisaxaridlari (LPS),

vakuollashtiruvchi sitotoksin (Vac A) va sitotoksin bilan bog'langan antijeni (Cag A) soni va turlari kasalliklarga olib keladigan virulent omillar sifatida aniqlangan.

2005 yilda Gill va uning hamkasblari ikkita sog'lom odamning oshqozon-ichak va og'iz yo'llarida yashovchi mikrobial jamoalarning birlashtirilgan genomlarini butun genomli ov miltig'i ketma-ketligidan foydalangan holda o'rganishdi. Bu ish "mikrobioma" va "mikrobiota" atamalarining birinchi qo'llanilishini belgilab berdi. Ular umumiy organizmlarning muhim qismiga ega bo'lishiga qaramay, ikkala shaxsning ichak va og'iz mikrobiomalari keskin farq qilganligini ko'rsatdi. *Helicobacter pylori* oshqozonda yashashi ma'lum bo'lsa-da, bir nechta tadqiqotlar ba'zi najas yoki yo'g'on ichak tarkibida *H. pylori* DNKsi mavjudligini aniqladi. Oila darajasida *H. pylori* infeksiyasi bo'lgan oxirgi bosqichdagi buyrak kasalligi (ESRD) bemorlarida aniqlangan ichak mikrobiotalarining ulushi infeksiyalanmagan *H. pylori* bilan kasallangan bemorlarga qaraganda ancha past edi. Bundan tashqari, *Veillonellaceae* oilasining mavjudligi sezilarli darajada oshgan va *Bifidobacteriaceae* mavjudligi sezilarli darajada kamaygan, *Ruminococcaceae* oilasi esa *H. pylori* eradikatsiyasidan keyin gemodializ (HD) bilan og'rigan bemorlarda *H. pylori* tarqalishidan farqli ravishda sezilarli darajada ko'paygan.

Helicobacter pylori ga qarshi immunitet immunitet tizimining infeksiyani bartaraf eta olmaganligi sababli istalmagan doimiy javob sifatida tavsiflangan. Bu javob xost tomonidan tug'ma va adaptiv immunitet mexanizmlari orqali tartibga solinadi va makrofaglar, monositlar va limfotsitlar (B va T) kabi immun tizimining turli xil hujayralarining murakkab tarmog'ini faollashtirish orqali amalga oshiriladi. *H. pylori* ga qarshi immunitetning natijasi himoya va patologik rol o'rtasida almashinadi. Bir tomondan, immunitet bakteriyalarni nazorat ostiga oladi va infeksiyaning nazoratsiz tarqalishini oldini oladi. Boshqa tomondan, surunkali infeksiya paytida bakteriyalarning davom etishi surunkali yallig'lanishga olib keladi, bu oshqozon yarasi kasalligi, atrofik gastrit va oshqozon saratoni kabi turli kasalliklar bilan bog'liq.

Xulosa: *H. pylori* bakteriyasining mavjudligi mikrobiotaning tarkibi, muvozanati va faolligini belgilaydi, bu esa o'z navbatida inson oshqozonidagi metabolik imkoniyatlarni, immunologik javobni va gomeostatik darajasini belgilaydi. Bakteriyalar o'rtasidagi o'zaro bog'liqlik kasalliklarning og'irligini aniqlaganligi sababli, *H. pylori* ni davolash va yo'q qilish patogen mexanizmlari hozircha tasdiqlanmagan boshqa surunkali kasalliklarning paydo bo'lishiga olib kelishi mumkin. Bunday asoratlarning oldini olish uchun profilaktika choralari, terapiyani ishlab chiqish, oshqozon va o'n ikki barmoqli ichakning gastropatogen bakteriyalarini

infektsiya bilan kasallangan bemorlarning oshqozon mikrobiotasini moslashtirishga qaratilgan ichaklardan olinadigan emlash zarur.

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KOMPOZITSIYA TAMOYILLARINING MUHANDISLIK GRAFIKASI VA LIBOS DIZAYNIDAGI ERGONOMIK QO‘LLANILISHI

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Annotatsiya

Ushbu maqolada kompozitsiya tamoyillarining muhandislik grafikasi va libos dizaynidagi ergonomik qo‘llanilishi tahlil qilinadi. Inson tana proporsiyalari, harakat dinamikasi, muhitga moslashuv kabi ergonomik omillar asosida kompozitsion tuzilmaning ilmiy va amaliy jihatlari yoritilgan. Shuningdek, muhandislik chizmachiligi, konstruktsion grafika va moda dizaynida kompozitsiyaning uyg‘unlik, mutanosiblik, ritm va kontrast tamoyillarini ergonomik asosda tatbiq etish metodikasi ko‘rib chiqiladi.

Kalit so‘zlar: kompozitsiya, ergonomika, muhandislik grafikasi, libos dizayni, proporsiya, muvozanat, ritm, estetik uyg‘unlik.

Abstract

This article analyzes the ergonomic application of composition principles in engineering graphics and clothing design. The scientific and practical aspects of compositional structure are covered based on ergonomic factors such as human body proportions, movement dynamics, and adaptation to the environment. It also examines the methodology for applying the principles of composition, harmony, proportion, rhythm, and contrast in engineering drawing, construction graphics, and fashion design on an ergonomic basis.

Keywords: composition, ergonomics, engineering graphics, clothing design, proportion, balance, rhythm, aesthetic harmony.

Zamonaviy dizayn va texnik ijodiyot sohalarida kompozitsiya tamoyillari ham estetik, ham funksional ahamiyat kasb etadi. Muhandislik grafikasi hamda libos dizayni inson faoliyatining ikki muhim yo‘nalishi sifatida o‘zaro yaqin nazariy asosga ega bo‘lib, ularni birlashtirib turuvchi muhim omil bu — ergonomikadir.

Ergonomika inson va texnik tizim o‘rtasidagi o‘zaro munosabatni o‘rganadigan fan bo‘lib, uning asosiy maqsadi — inson faoliyatini qulay, xavfsiz va samarali tashkil

etishdir. Shunday ekan, libos dizayni va muhandislik grafikasi jarayonlarida ergonomik tamoyillarni kompozitsiya nazariyasi bilan uyg'unlashtirish zamonaviy dizayn ta'limi va ishlab chiqarish amaliyotida dolzarb masaladir.

Kompozitsiya — bu tasviriy, fazoviy va funksional elementlarning ma'lum tartibda joylashuvi orqali yaxlit badiiy shakl yaratish jarayonidir. Muhandislik grafikasi va libos dizaynida bu jarayon nafaqat estetik, balki texnologik va amaliy asosga ham ega.

1. Kompozitsiya va ergonomikaning o'zaro bog'liqligi

Kompozitsiya va ergonomika o'zaro bir-birini to'ldiruvchi tizimlardir. Agar kompozitsiya predmetning tashqi tuzilishini, ritm, proporsiya, rang va shakl uyg'unligini belgilasa, ergonomika bu shakllarning inson tana tuzilishi va fiziologik qulayligiga mosligini nazorat qiladi.

Muhandislik grafikasi fanida kompozitsion qonuniyatlar detallarni joylashtirishda, konstruksiyalarning muvozanatini ta'minlashda, chizmalarda vizual aniqlik va estetik uyg'unlikni yaratishda muhim ahamiyatga ega. Shu bilan birga, ergonomik tahlil detallarni inson harakati, qo'l uzunligi, ko'rish burchagi va ish qulayligiga moslashtirishni ta'minlaydi.

Libos dizaynida esa kompozitsion tamoyillar — ritm, kontrast, simmetriya, asimmetriya, markaz, proporsiya — inson gavdasi proporsiyalariga asoslanadi. Masalan, "oltin kesim" tamoyili inson gavdasining tabiiy mutanosibliklariga mos keladi. Shu sababli ergonomik tahlil libosning shaklini, chiziqlar yo'nalishini, ranglar nisbatini to'g'ri tanlashda asosiy rol o'ynaydi.

2. Muhandislik grafikasi jarayonida kompozitsiya tamoyillarining ergonomik qo'llanilishi

Muhandislik grafikasi inson tafakkurining texnik va estetik uyg'unligini aks ettiradi. Bu fan orqali texnik ob'ektlarning shakli, konstruksiyasi, fazoviy joylashuvi va funksional tuzilishi aniqlanadi. Muhandislik chizmasini yaratishda kompozitsion tamoyillar quyidagi yo'nalishlarda qo'llaniladi:

- Muvozanat (balans): chizma elementlarining simmetrik yoki asimmetrik joylashuvi orqali vizual barqarorlik hosil qilinadi;
- Ritm: chizmada takrorlanuvchi shakllar, chiziqlar yoki o'lchamlar tizimi texnik uyg'unlikni yaratadi;
- Proporsiya: detallar o'lchamlarining o'zaro mutanosibligi konstruksiyaning estetik yaxlitligini ta'minlaydi;
- Markaz va diqqat nuqtasi: asosiy elementlarning joylashuvi o'quvchi e'tiborini muhim qismlarga yo'naltiradi.

Ergonomik yondashuv esa bu kompozitsion tuzilmani inson harakat dinamikasi, ish qulayligi va vizual sezgirlik asosida moslashtirishni nazarda tutadi. Masalan, texnik panellar, boshqaruv bloklari yoki grafik interfeyslar chizilayotganda insonning ko‘rish burchagi (15–20° pastga) hisobga olinadi. Bu — ergonomikaning muhandislik grafikasi bilan uzviy aloqasini isbotlaydi.

3. Libos dizaynida kompozitsiya tamoyillarining ergonomik tatbiqi

Libos dizaynida kompozitsiya tamoyillari inson tanasining estetik proporsiyalariga bevosita bog‘liq. Libosning shakli, rangi, fakturasi, chizig‘i va silueti inson gavdasining tabiiy proporsiyalariga mos kelishi lozim.

Ergonomik yondashuv libos dizaynida quyidagilarni ta‘minlaydi:

- inson harakatini cheklamaydigan, qulay shakl yaratish;
- tana proporsiyalariga muvofiq chiziqlar tizimini ishlab chiqish;
- vizual og‘irlik va muvozanatni to‘g‘ri taqsimlash;
- materialning havo o‘tkazuvchanligi, egiluvchanligi, harakat elastikligini inobatga olish.

Masalan, libos dizaynida “vertikal ritm” inson bo‘yini vizual cho‘zadi, “gorizontal ritm” esa kenglikni ta‘kidlaydi. “Markaz tamoyili” — dizayn kompozitsiyasida asosiy diqqat nuqtasini belgilaydi. Ergonomik tahlil bu tamoyillarni nafaqat estetik, balki funksional jihatdan ham moslashtirishga yordam beradi.

Libosning ergonomik dizayni o‘z ichiga quyidagilarni oladi:

- antropometrik o‘lchovlar asosida shakl yaratish;
- harakat erkinligini ta‘minlovchi kesim tizimi;
- issiqlik, harakat, to‘qima va material xususiyatlariga moslashuv;
- individual estetik did va qulaylik uyg‘unligini ta‘minlash.
-

4. Kompozitsiya va ergonomikaning integratsion modeli

Kompozitsiya va ergonomika o‘zaro integratsiya qilinib, dizaynning estetik-funksional modelini hosil qiladi. Quyidagi jadval bu integratsiyani ifodalaydi:

Kompozitsiya tamoyili	Ergonomik talabi	Natijaviy samara
Proporsiya	Antropometrik moslik	Shaklning tabiiy mutanosibligi
Muvozanat	Barqarorlik va qulaylik	Vizual va jismoniy uyg‘unlik
Ritm	Harakat dinamikasi	Estetik harakat tuyg‘usi
Markaz	Vizual diqqat nuqtasi	Kompozitsiyaning badiiy yaxlitligi
Kontrast	Sezgi farqlanishi	Dinamik ko‘rinish va ifoda

Xulosa

Kompozitsiya tamoyillari muhandislik grafikasi va libos dizaynining estetik va funksional asosini tashkil etadi. Ularni ergonomik yondashuv bilan uyg'unlashtirish inson uchun qulay, estetik jihatdan mukammal va funksional jihatdan samarali mahsulot yaratish imkonini beradi. Muhandislik grafikasi sohasida ergonomika chizma, detallar va interfeyslarni inson fiziologiyasiga moslashtirish orqali texnik dizayn sifatini oshiradi. Libos dizaynida esa u estetik shakl, tana proporsiyasi va harakat qulayligini uyg'unlashtirish orqali badiiy va amaliy mukammallikka erishishga xizmat qiladi. Shunday qilib, kompozitsiya va ergonomika o'zaro integratsiyalashgan holda zamonaviy dizayn ta'limining ilmiy-metodik poydevorini tashkil etadi.

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GLAUKOMA SABABLI RIVOJLANADIGAN KO'RUV NERVI ATROFIYASINING ERTA DIAGNOSTIKASI: ZAMONAVIY USULLAR VA ULARNING SAMARADORLIGI

Zuhra Berdieva

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Dolzarbliqi. Ko'ruv nervi — inson tanasidagi o'ziga xos tuzilmalardan biri bo'lib, u ko'zdan miyaga vizual ma'lumotlarni uzatuvchi minglab asab tolalaridan iborat. Bu tolalar shikastlanganda yoki nobud bo'lganda, ularning o'rnida biriktiruvchi to'qima paydo bo'ladi va bu ko'rish qobiliyatining qaytarilmas yo'qolishiga olib keladi. Statistik ma'lumotlarga ko'ra, global ko'rlik holatlarining kamida 20% i ko'ruv nervi atrofiyasi bilan bog'liq. Kasallik ko'p hollarda erta bosqichlarda belgilarisiz kechadi va bemor ko'rish buzilishlarini sezganida nerv tolalarining katta qismi allaqachon zararlangan bo'ladi. Shu bois, atrofiya jarayonini imkon qadar erta bosqichda aniqlash va zamonaviy diagnostika usullaridan samarali foydalanish ko'rish qobiliyatini saqlab qolish uchun muhim ahamiyatga ega.

Tadqiqot maqsadi. Glaukoma sababli yuzaga keluvchi ko'ruv nervi atrofiyasining zamonaviy usullar orqali erta tashxis qo'yish.

Materiallar va metodlar. Tadqiqot Toshkent tibbiyot akademiyasining ko'z kasalliklari bo'limida o'tkazilib, glaukoma sababli ko'ruv nervi atrofiyasidan shubha qilingan 30 nafar bemor qatnashdi. Bemorlar uchta guruhga bo'linib, har biri turli diagnostika yondashuvlari asosida baholandi:

1-guruh (n=10): Faqat tonometriya (Goldman usuli) orqali ko'z ichki bosimi baholandi. 2-guruh (n=10): Faqat optik koherens tomografiya (OCT) yordamida RNFL va GCC qalinligi o'lchandi. 3-guruh (n=10): OCT va kompyuter perimetriya (Humphrey visual field test) kombinatsiyalangan holda qo'llanildi.

OCT orqali ko'ruv nervi tolalari qalinligi, ganglion hujayralar kompleksi va disk chuqurligi baholandi. Perimetriya yordamida ko'rish maydoni buzilishlari (MD, PSD, VFI) tekshirildi.

Natijalar va tahlil. Tonometriya: Bu usul ko'z ichki bosimini baholashda muhim bo'lsa-da, erta atrofiya bosqichlarini aniqlash uchun yetarlicha sezgirlikka ega emas (sezgirlik: 50–75%). OCT: RNFL va GCC qalinligining sezilarli darajada yupqalashgani erta atrofiya belgilari sifatida qayd etildi. Bu usulning sezgirligi va aniqligi yuqori bo'lib, nerv to'qimalarining strukturaviy o'zgarishlarini aniq baholashga imkon berdi (sezgirlik: 85–95%). Kompleks yondashuv: OCT + kompyuter perimetriya kombinatsiyasi eng samarali natijalarni ko'rsatdi.. Aynan shu guruhda erta

atrofiya holatlari eng ko‘p qayd etildi (70%). Olingan natijalar shuni ko‘rsatdiki, faqat tonometriya orqali glaukomaning erta bosqichlarini aniqlash qiyin bo‘lishi mumkin. OCT yordamida ko‘ruv nervi tolalarining qalinligini baholash strukturaviy o‘zgarishlarni erta aniqlash imkonini beradi. Kompyuter perimetriya esa funksional o‘zgarishlarni kuzatishda muhim rol o‘ynaydi. Bu ikki usulning kombinatsiyasi diagnostika jarayonining aniq va samarali bo‘lishini ta’minlaydi.

Xulosa. Tadqiqot natijalariga ko‘ra, glaukoma sababli yuzaga keladigan ko‘ruv nervi atrofiyasini erta bosqichda aniqlash uchun kompleks yondashuv qo‘llash zarur. Ayniqsa, OCT va kompyuter perimetriya kombinatsiyasi orqali erta atrofiya va funksional buzilishlar aniqlanib, bemorlarga o‘z vaqtida davolash choralari ko‘rilishi mumkin. Shu bois, klinik amaliyotda zamonaviy diagnostika texnologiyalaridan keng foydalanish ko‘rlikning oldini olishda muhim ahamiyatga ega.

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