

GEORGIAN MEDICAL NEWS

ISSN 1512-0112

NO 10 (343) Октябрь 2023

ТБИЛИСИ - NEW YORK



ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

Monthly Georgia-US joint scientific journal published both in electronic and paper formats of the Agency of Medical Information of the Georgian Association of Business Press.
Published since 1994. Distributed in NIS, EU and USA.

GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и http://www.nlm.nih.gov/bsd/uniform_requirements.html В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректур авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

Martirosyan T.R. ON THE RESULTS OF A SYSTEMIC MULTIFACTOR ANALYSIS WITH MATHEMATICAL MODELING OF THE INDICATORS OF MEDICAL EXPERTISE OF YOUNG MALES WITH SURGICAL DISEASES IN THE REPUBLIC OF ARMENIA.....	6-13
Hussam S. Ahmed, Nihad N. Hilal, Mohamed G. Zakari. EVALUATION OF VITAMIN K2 IN PATIENTS WITH TYPE 2 DIABETES MELLITUS.....	14-17
Denis Shiyan, Olga Trach, Liliia Sosonna, Nadiia Yurevych, Ganna Chekhovska, Denys Malieiev, Victoriia Alekseeva, Vitaliy Gargin. PEDAGOGICAL ASPECTS OF THE IMPACT OF SMOKING ON THE HUMAN BODY BASED ON RADIOGRAPHIC DENSITY INDICATORS OF MAXILLARY SINUS BONE WALLS.....	18-22
Tereza Azatyan. THE RHEOENCEPHALOGRAPHIC STUDY OF THE INTERHEMISPHERIC ASYMMETRY OF CEREBRAL BLOOD FLOW IN HEALTHY AND MENTALLY RETARDED CHILDREN.....	23-27
Asmaa Y Thanoon, Faehaa Azher Al-Mashhadane. RELATIONSHIP BETWEEN VITAMIN D DEFICIENCY AND CHRONIC PERIODONTITIS.....	28-32
Maia Ispireli, Irma Buchukuri, Tamar Ebanoidze, Giorgi Durglishvili, Nato Durglishvili, Nana Chkhikvishvili, Leila Beridze. CORRELATES OF ATOPIC DERMATITIS CHARACTERISTICS IN MILITARY PERSONNEL.....	33-37
Suhas Ballal, Amandeep Singh, Nimisha Jain, Harsh Bhati, Salahuddin, Devanshu J. Patel. AN IN-DEPTH ASSESSMENT OF THE TUMOR'S IMPACT ON SARCOPENIA.....	38-43
Lilia Robert Mirzoyan, Nara Azat Mkrtchyan, Sergey Nikolay Simonov, Zinaida Tital Indoyan. ASSESSMENT OF THE QUALITY OF LIFE AND PREVALENCE OF POSSIBLE OSTEOPOROTIC CHANGES IN POSTMENOPAUSAL WOMEN IN YEREVAN BASED ON DATA OF THE ECOS-16 QUESTIONNAIRE.....	44-49
Alexander Schuh, Inge Unterpainner, Stefan Sesselmann, Matthias Feyrer, Philipp Koehl. CUBITAL TUNNEL SYNDROME DUE TO AN INTRANEURAL GANGLION CYST OF THE ULNAR NERVE.....	50-52
Ahmed Mohammed Ibrahim, Bashar Sh. Mustafa, Fahad A. Jameel. PREDICTION OF IRON DEFICIENCY IN CHILDREN USING EASY LABORATORY TOOLS.....	53-56
Sharadze D. Z, Abramov A. Yu, Konovalov O.E, Fomina A.V, Generalova Yu.A, Kakabadze E. M, Bokova E. A, Mityushkina T.A, Korovushkina E.K, Kozlova Z.V, Eliseeva T.A. THE OCCURRENCE OF SPORTS INJURIES AMONG PRE-ADOLESCENTS.....	57-62
Balasis J. mahmmoed, Nihad N. Hilal, Entedhar R. Sarhat. EVALUATION OF FETUIN-A LEVEL IN POLYCYSTIC OVARY SYNDROME AND ITS ASSOCIATION WITH ASPROSIN AND SOME BIOCHEMICALPARAMETERS.....	63-66
Boldyreva Yu.V, Lebedev I.A, Zakharchuk E.V, Shhepankevich L.A, Tersenov A.O. THERAPEUTIC USE OF RESVERATROL IN THE TREATMENT OF NEUROLOGICAL AND ENDOCRINOLOGICAL PATIENTS.....	67-70
Suhas Ballal, Nabeel Ahmad, Anand Mohan Jha, Vasundhara Sharma, Rakhi Mishra, Geetika M. Patel. AN EVALUATION OF ANTIBIOTIC PRESCRIPTION PRACTICES: PERSPECTIVES OF VETERINARY TRAINEES AND PRACTICING VETERINARIANS.....	71-77
Elguja Ardia, Tamaz Gvenetadze, Teimuraz Gorgodze, Emzar Diasamidze. CHANGES IN SPERMATOGENESIS AFTER SIMULATED INGUINAL HERNIA REPAIR IN EXPERIMENT.....	78-83
Ioseb Begashvili, Merab Kiladze, George Grigolia. EFFECT OF INHALED OXYGEN CONCENTRATION ON PULMONARY GAS EXCHANGE DURING OFF-PUMP CORONARY BYPASSGRAFTING.....	84-90
Saif Aldeen Alkakaee, Jawnaa Khalid Mamdoh. COQ10 PROVIDES CARDIOPROTECTION AGAINST THE TOXIC EFFECTS OF TRASTUZUMAB AND DOXORUBICIN IN RAT MODEL.....	91-97
Geetika M. Patel, Upendra Sharma.U.S, Bhupendra Kumar, Pankti Patel, Ashish Chander, Pankaj Kumar Tyagi. UNDERSTANDING THE VITAL DETERMINANTS SHAPING LEARNERS' PHYSICAL ACTIVITYAND PSYCHOEMOTIONAL WELLBEING IN THE COVID-19 PERIOD.....	98-103
Matthias Feyrer, Alexander Schuh, Holger Rupprecht, Harald Hennig, Stefan Sesselmann, Philipp Koehl. TRAUMATIC PULMONARY HERNIATION: A RARE CHEST TRAUMA MANIFESTATION.....	104-106
Sami A. Zbaar, Sawsan S. Hosi, Doaa Sabeeh Al-Nuaimi. ASSOCIATION OF NESFATIN-1 AND INSULIN RESISTANCE IN OBESE ADOLESCENTS OF IRAQI POPULATION.....	107-110
Hassan A. Saad, Mohamed E. Eraky, Ahmed K El-Tahe, Mohamed Riad, Khaled Sharaf, Azza Baz, Mohamed I. Farid, Ahmed Salah Arafa. A THOROUGH STUDY AND META-ANALYSIS OF THE PROGNOSTIC RELEVANCE OF THE C-REACTIVE-ALBUMIN RATIO IN ACUTEPANCREATITIS.....	111-118

Shoko Nishikawa, Takuma Hayashi, Tohko Uzaki, Nobuo Yaegashi, Kaoru Abiko, Ikuo Konishi. POTENTIAL LIFE PROGNOSTIC MARKER FOR MESENCHYMAL TUMOR RESEMBLING UTERINE LEIOMYOSARCOMA...	119-126
Lytvynenko M.V, Antonenko P.B, Lobashova K.G, Kashchenko O.A, Bondarenko A.V, Bondarenko O.V, Gargin V.V. PECULIARITIES OF IMMUNE STATUS IN THE PRESENCE OF SECONDARY IMMUNODEFICIENCY OF INFECTIOUS AND NON- INFECTIOUS ORIGIN IN WOMEN OF REPRODUCTIVE AGE.....	127-133
Devanshu J. Patel, Uzma Noor Shah, Nabeel Ahmad, Rajnish Garhwal, Sudhir Singh, Arvind Kumar. UNDERSTANDING THE ADAPTATION AND SENSITIVITY OF THE MICROBIOME: MICROBIAL RESILIENT AND HUMAN WELL- BEING.....	134-138
Sarkulova Zh.N, Tokshilykova A.B, Sarkulov M.N, Daniyarova K.R, Kalieva B.M, Tleuova A.S, Satenov Zh.K, Zhankulov M.H, Zhienalina R.N. FACTORS OF AGGRESSION AT THE STAGES OF OPEN SURGICAL TREATMENT OF SEVERE FORMS OF PERITONITIS.....	139-143
Anamika Tiwari, Geetika M. Patel, Nayana Borah, Amandeep Singh, Shabir Ahmad Shah, Anish Prabhakar. COVID-19 SAFETY MEASURES AND THEIR EFFECTS ON GAMBLING HABITS: AN INVESTIGATIVE STUDY.....	144-152
Mohammed.A.Alghamdi, Rajab Alzahrani, Abdullah Alghamdi, Mujtaba A.Ali, Amal M.Alghamdi, Waad M.Alghamdi, Kholoud M.Alghamdi, Shroog M Alghamdi. AWARENESS AND KNOWLEDGE OF OBSTRUCTIVE SLEEP APNEA AMONG THE POPULATION OF THE AL-BAHA REGION OF SAUDI ARABIA: A CROSS-SECTIONAL STUDY.....	153-158
Khoroshukha M, Bosenko A, Nevedomsjka J, Omeri I, Tymchyk O. INFLUENCE OF SEROLOGICAL MARKERS OF BLOOD GROUPS ON THE DEVELOPMENT OF VISUAL MEMORY FUNCTION IN YOUNG FEMALE ATHLETES AGED 13-15 YEARS.....	159-164
Kavina Ganapathy, Bhupendra Kumar, Shubham Shekhawat, Soubhagya Mishra, Rashmi Mishra, Devanshu J. Patel. EXPLORING CLINICAL VARIATIONS AND CO-MORBID TRENDS IN PD-MCI GROUPS.....	165-171
Georgi Tchernev. METASTATIC NODULAR MELANOMA DEVELOPING ON NEVUS SPILUS DURING INTAKE OF BETA BLOCKERS (BISOPROLOL/ NEBIVOLOL) AND ACE INHIBITORS (PERINDOPRIL). POTENTIAL LINKS TO THE DRUG RELATED NITROSOGENESIS/CARCINOGENESIS, DUNNING-KRUGER EFFECT AND GENETIC WEAPONS OF THE NEW GENERATION.....	172-178
Sanjeev Kumar Jain, Swarupanjali Padhi, Geetika M. Patel, Malathi.H, Bhupendra Kumar, Shweta Madaan. AN INCREASED RISK OF HORMONAL DISORDERS, PRIMARILY DIABETES, IN INDIVIDUALS WITH β -THALASSEMIA MAJOR: A RETROSPECTIVE ANALYSIS.....	179-185
Garima Jain, Komal Patel, Uzma Noor Shah, Minnu Sasi, Sanjana Sarna, Sudhir Singh. INNOVATIONS IN FOCUS: MECHANISTIC DISEASE THEORIES, CLIMATE DYNAMICS, AND HOST-PARASITE ADAPTATIONS.....	186-192
Sharadze D. Z, Abramov A. Yu, Konovalov O.E, Fomina A.V, Generalova Yu.A, Kakabadze E. M, Bokova E. A, Eliseeva T.A, Kostinskaya M.V, Smirnov D.P, Urazgulov A.K. THE INCIDENCE OF SPORTS INJURIES AMONG SCHOOL-AGED CHILDREN AND ADOLESCENTS.....	193-198
Raman Batra, Devanshu J. Patel, Asha.K, Amandeep Singh, Shivam Bhardwaj, Prerana Gupta. EXPLORING MEDICAL STUDENTS' COMPETENCY IN UNDERSTANDING PRIMARY IMMUNODEFICIENCY DISEASES IN INDIA.....	199-203
Matthias Feyrer, Stefan Sesselmann, Philipp Koehl, Alexander Schuh. AN INTRATENDINOUS GANGLION CYST OF THE PATELLAR TENDON: A RARE CAUSE OF ANTERIOR KNEE PAIN.....	204-205

INFLUENCE OF SEROLOGICAL MARKERS OF BLOOD GROUPS ON THE DEVELOPMENT OF VISUAL MEMORY FUNCTION IN YOUNG FEMALE ATHLETES AGED 13-15 YEARS

Khoroshukha M¹, Bosenko A², Nevedomsjka J¹, Omeri I¹, Tymchyk O¹.

¹Boris Grinchenko University of Kyiv, Kyiv, Ukraine.

²State Institution "South Ukrainian National Pedagogical University named after K.D. Ushinsky", Odessa, Ukraine.

Abstract.

The article investigates the influence of serological markers of blood groups on the development of the mental function of visual memory of young female athletes aged 13-15 years. The study involved girls of a specialised sports institution (n=168), who were divided into two groups: group A - speed and power sports (n=83); group B - endurance sports (n=85). The control group consisted of female students of secondary schools aged 13-15 years (n=113) and female students of higher education institutions aged 17-20 years (n=213) who do not engage in sports. The study of short-term visual memory function was conducted using the method of "memory for geometric shapes", which was proposed by Makarenko M.V. in co-authorship. The person had to memorise the location of 7 figures within 30 s and then reproduce them on a blank registration form within 45 s. The number of figures correctly drawn and placed in the form (correct answers) and the number of errors made by the person during the entire period of work were counted. The fact of possible use of blood groups in genetic prediction of the development of visual memory of the subjects was established. It was found that female students with blood group 0(I) who do not engage in sports have the best associative relationships with the properties of the mentioned function, while the worst relationship remains unclear. In female athletes with blood group 0(I), there is only a tendency towards improved development of the above function. The factor of sexual dimorphism does not make significant adjustments to the specifics of changes in visual memory function.

Key words. Mental functions, visual memory, research, athletes, pupils, students.

Introduction.

Modern researches have established that the function of visual memory, as a mental property of a person, which opens up opportunities for the accumulation of life experience, is an active process in human activity [1-4], and in the practice of sport, like other mental functions (attention, thinking, perception), directly affects the efficiency of sports activity [5,6]. In particular, it has been established that in certain sports that require athletes to quickly and accurately assess situations, think and make the right decisions in the face of progressive fatigue (for example, in game sports [7], tennis [8], sports orienteering [9], rhythmic gymnastics group exercise teams [10], etc.), In this regard, the level of development of memory properties (visual, auditory) in athletes and physical educators remains higher than in people who do not engage in sports [11,12].

Despite the fact that the function of visual memory is characterised by a pronounced genetic heredity [4] and is poorly subject to correction by means of physical education [13-15].

From the results of research by M.F. Khoroshukha [16,17], we find the fact of a specific (selective) influence of the orientation of the training process on the development of the visual memory function of pupils and students.

There is a large number of fundamental studies that note the positive impact of memory and attention functions on the academic performance of pupils and students. In particular, studies by M.V. Makarenko and V.S. Lyzogub [15] found that there is a close correlation between the academic performance of high school and university students and the amount of short-term visual memory. Researchers C. Fitzpatrick, L.S. Pagani [18] and Friso-van den Bos, S. H. G. van der Ven, E. H. Kroesbergen, J. E. H. van Luit [19] have found positive relationship between the development of working memory of young children and their academic performance in primary school.

Recent studies have highlighted the associative relationships between serological markers of blood groups and the possibilities of developing both motor skills of athletes [20,21] and certain (attention, logical thinking) mental properties of mainly adults [22]. In our previous studies, we analysed the influence of serological markers of blood groups on the development of basic mental functions of young athletes (boys) aged 13-16 years [23-26]. The general conclusion of these studies is the establishment of the fact that it is possible to use serological markers of blood groups in the genetic prediction of the development of basic mental qualities of adolescent athletes. However, there has been no study of the possibilities of developing mental functions (in our case, visual memory) in their peers - female athletes. The study of this problem is of not only theoretical but also practical interest. Knowledge about the influence of serological markers of blood groups on the development of visual memory of schoolchildren can be used in the practice of genetic psychological and pedagogical counselling on the problems of their choice of sports and professional activities. In our opinion, it can also be used in the practice of professional and psychological selection of military personnel for certain types of professional activity [27].

In this regard, the question of the influence of serological markers of blood groups on the development of visual memory function of girls aged 13-15 years specialising in sports of different training orientation is relevant and remains unaddressed by scientists. In addition to the above, we would like to add that our previously published studies have analyzed the impact of serological markers of blood groups on the development of attention [28], time perception [29] and logical thinking [30] in young adolescent female athletes.

Materials and methods.

The study involved young athletes (girls) aged 13-15 years (n=168) from a specialised sports institution - Brovary Sports

Professional College (experimental group), who were divided into two groups: group A (n=83) - speed and power sports (freestyle wrestling, track and field athletics: sprint running, hurdles, jumping, shot put and discus throwing); group B (n=85) - endurance sports (skiing, swimming: 200, 400 and 1500 m, athletics: 800, 1500, 3000 and 5000 m, race walking). The control group of subjects was divided into two subgroups: subgroup 1 - 13-15 years old female pupils of secondary school No. 3 in Brovary (Kyiv region) who did not engage in sports (n=113); subgroup 2 - female students of 1-3 years of study aged 17-20 (n=213) of the Drahomanov National Pedagogical University (n=115) and Borys Grinchenko Kyiv University (n=98) who also did not engage in sports.

The study of individual peculiarities of short-term visual memory was carried out using the "memory for geometric shapes" method [31]. During this test, the subject was presented with forms depicting geometric shapes in the amount of 7 pieces. The subject had to memorise their location within 30 seconds, and then reproduce the figures on a blank registration form within 45 seconds. The test task was performed twice using similar forms. The number of shapes correctly drawn and placed in the registration form (correct answers) and the number of errors (units) of the subject for the entire period of work were counted. The results of the two tasks were used to assess the state of the individual's "visual memory" in terms of conditional points. The test results were evaluated according to the following scheme [31]:

Score, points	10	9	8	7	6	5	4	3	2	1
Correct answers, number	14	13	12	11	9-10	7-8	5-6	4	3	2

The tests were conducted in an isolated room in the morning (from 9 to 12 am, no earlier than 2 hours after eating). One or two days before the examination, the examinees were asked to reduce physical activity by 50% in volume and intensity, not to take tonic or sedative pharmacological drugs, and not to drink strong tea or coffee on the day of the test.

Data on blood groups were taken from the medical records of the subjects. Individuals who did not have data on their blood group were not allowed to be tested.

In the course of the research, the reliability of the difference between individuals with different ABO blood groups representing the experimental (young athletes) and control (schoolchildren and students who did not play sports) groups. The results of the conducted research were statistically processed using the package of the standard computer program "STATISTICA 10". Arithmetic mean (X), mean square deviation (SD) and error of the mean (m) were calculated. The probability of group differences between values (p) was assessed by the parametric Student's t-test. The difference was considered statistically probable at the 5% level of significance (at $p < 0.05$).

The purpose of the article is to investigate the influence of serological markers of blood groups on the development of short-term visual memory function of young adolescent athletes with regard to sexual dimorphism.

Research methods: theoretical analysis and synthesis of scientific and methodological literature, pedagogical

observation, testing, statistical methods.

Results.

The results of the study of the function of short-term visual memory of young female athletes aged 13-15 years without taking into account the specifics of their sports are presented in Table 1. The analysis of changes of indicators of the specified mental function at performance of the test "memory for geometrical figures" revealed the following: the number of errors made by girls remained practically the same for most of them, and therefore no significant differences ($P > 0.05$) were found among those with 0(I), A(II), B(III) and AB(IV) blood groups according to the ABO system; as expected, no significant differences were found in the overall assessment of visual memory function ($P > 0.05$). However, as can be seen, the tendency to improve the development of this function was clearly observed in athletes with blood group 0(I).

The following two tables (Tables 2 and 3) present the data of comparative analysis of indicators of visual memory function in young sportswomen who specialised in sports with different orientation of the training process (group A - speed and power sports, group B - endurance sports).

The analysis of the actual material of the above tables showed that between the indicators of the visual memory function (the number of errors, the general assessment) in young sportswomen of 13-15 years old, some of whom mainly developed speed and power qualities (Table 2), and others - the quality of endurance (Table 3), there was no statistically significant difference ($P > 0.05$), although, as in the first variant (see Table 1), the tendency to improve the development of the above function is clearly traced in persons with 0(I) blood group.

The nature of changes in average values of visual memory function in adolescent girls who did not engage in sports is shown in Table 4. The data in this table show that girls with different blood groups who did not engage in sports, in contrast to sportswomen, had significant differences in the values of the registered indicators. Thus, girls with blood group 0(I) (by all indicators) had significantly better values of visual memory function compared to their peers - girls with blood groups A(II) and B(III) ($P < 0.05$ in both cases). However, the changes in these indicators did not have a statistically significant difference between individuals of 0(I) and AB(IV) blood groups, as well as between individuals of A(II), B(III) and AB(IV) blood groups ($P > 0.05$).

From our previous studies involving boys aged 13-16 years [23-26] and girls aged 13-15 years [28-30], it is known that the main mental signs of a person (attention, perception, thinking) were more pronounced in youth than in adolescence. In this regard, we studied the indicators of visual memory function in adolescent women - students aged 17-20 years of higher education institutions who did not engage in sports. The materials of these studies are presented in Table 5.

From the data in this table, it follows that students with blood group 0(I) had significantly better values of the short-term visual memory property in terms of the average number of errors and the overall score in the development of the above function compared to individuals of blood groups A(II) and B(III) ($P < 0.05$ in both cases). Whereas no significant difference

Table 1. Indicators of visual memory function in young sportswomen of 13-15 years old (without taking into account the specifics of sports) with different blood groups, $X \pm m$, ($n=168$).

№	Blood groups	n	Visual memory	
			Number of errors, units	Score, points
1	O(I)	48	2,6±0,28	7,5±0,24
2	A(II)	50	3,0±0,31	7,1±0,24
3	B(III)	37	3,2±0,36	7,2±0,30
4	AB(IV)	33	3,1±0,35	7,1±0,28
Reliability of the difference		P1–P2	>0,05	>0,05
		P1–P3	>0,05	>0,05
		P1–P4	>0,05	>0,05
		P2–P3	>0,05	>0,05
		P2–P4	>0,05	>0,05
		P3–P4	>0,05	>0,05

Table 2. Indicators of visual memory function in young sportswomen of 13-15 years old who mainly developed high-speed and power qualities (group A) with different blood groups, $X \pm m$, ($n=83$).

№	Blood groups	n	Visual memory	
			Number of errors, units	Score, points
1	O(I)	26	2,9±0,34	7,3±0,28
2	A(II)	24	3,3±0,39	6,8±0,28
3	B(III)	18	3,5±0,42	6,7±0,38
4	AB(IV)	15	3,4±0,38	6,8±0,32
Reliability of the difference		P1–P2	>0,05	>0,05
		P1–P3	>0,05	>0,05
		P1–P4	>0,05	>0,05
		P2–P3	>0,05	>0,05
		P2–P4	>0,05	>0,05
		P3–P4	>0,05	>0,05

Table 3. Indicators of visual memory function in young sportswomen of 13-15 years old who mainly developed the quality of endurance (group B) with different blood groups, $X \pm m$, ($n=85$).

№	Blood groups	n	Visual memory	
			Number of errors, units	Score, points
1	O(I)	24	2,4±0,32	7,7±0,27
2	A(II)	24	2,8±0,34	7,4±0,29
3	B(III)	19	3,0±0,41	7,2±0,33
4	AB(IV)	18	2,7±0,44	7,5±0,39
Reliability of the difference		P1–P2	>0,05	>0,05
		P1–P3	>0,05	>0,05
		P1–P4	>0,05	>0,05
		P2–P3	>0,05	>0,05
		P2–P4	>0,05	>0,05
		P3–P4	>0,05	>0,05

Table 4. Indicators of visual memory function in 13–15-year-old female pupils who did not go in for sports, with different blood groups, $X \pm m$, ($n=113$).

№	Blood groups	n	Visual memory	
			Number of errors, units	Score, points
1	O(I)	29	2,3±0,28	7,8±0,24
2	A(II)	34	3,2±0,33	7,1±0,23
3	B(III)	26	3,2±0,30	7,1±0,22
4	AB(IV)	24	2,9±0,29	7,3±0,25
Reliability of the difference		P1–P2	<0,05	<0,05
		P1–P3	<0,05	<0,05
		P1–P4	>0,05	>0,05
		P2–P3	>0,05	>0,05
		P2–P4	>0,05	>0,05
		P3–P4	>0,05	>0,05

Table 5. Indicators of visual memory function in female students aged 17-20 who did not engaged in sports, with different blood groups, $X\pm m$, ($n=213$).

№	Blood groups	n	Visual memory	
			Number of errors, units	Score, points
1	O(I)	62	1,7±0,20	8,3±0,17
2	A(II)	67	2,4±0,19	7,7±0,16
3	B(III)	53	2,4±0,26	7,7±0,23
4	AB(IV)	31	2,3±0,34	7,8±0,30
Reliability of the difference		P1–P2	<0,05	<0,05
		P1–P3	<0,05	<0,05
		P1–P4	>0,05	>0,05
		P2–P3	>0,05	>0,05
		P2–P4	>0,05	>0,05
		P3–P4	>0,05	>0,05

Table 6. Comparative analysis of average values of visual memory development in young sportsmen (girls and boys) of specialised sports institutions (without taking into account specificity of sports) with different blood groups, $X\pm m$, ($n=311$).

Memory function indicators	Statistical indicators	Blood groups			
		O(I)	A(II)	B(III)	AB(IV)
Girls (1)					
Number of errors, units.	$X\pm m$	n=51	n=51	n=37	n=33
		2,6±0,28	3,0±0,31	3,2±0,36	3,1±0,35
Score, points	$X\pm m$	7,5±0,24	7,1±0,24	7,2±0,30	7,1±0,28
Boys (2) [28]					
Number of errors, units.	$X\pm m$	n=46	n=43	n=28	n=22
		2,9±0,24	3,4±0,28	3,5±0,32	3,5±0,33
Score, points	$X\pm m$	7,2±0,20	6,9±0,22	6,7±0,23	6,7±0,26
Number of errors, units.	P1–P2	>0,05	>0,05	>0,05	>0,05
Score, points	P1–P2	>0,05	>0,05	>0,05	>0,05

Table 7. Comparative analysis of average values of visual memory development in pupils (girls and boys) of secondary schools who did not engage in sports, with different blood groups, $X\pm m$, ($n=219$).

Memory function indicators	Statistical indicators	Blood groups			
		O(I)	A(II)	B(III)	AB(IV)
Girls (1)					
Number of errors, units.	$X\pm m$	n=29	n=34	n=26	n=24
		2,3±0,28	3,2±0,33	3,2±0,30	2,9±0,29
Score, points	$X\pm m$	7,8±0,24	7,1±0,23	7,1±0,22	7,3±0,25
Boys (2) [28]					
Number of errors, units.	$X\pm m$	n=28	n=30	n=26	n=22
		2,8±0,34	3,2±0,34	3,2±0,28	3,0±0,28
Score, points	$X\pm m$	7,4±0,30	7,1±0,26	7,0±0,24	7,1±0,25
Number of errors, units.	P1–P2	>0,05	>0,05	>0,05	>0,05
Score, points	P1–P2	>0,05	>0,05	>0,05	>0,05

Table 8. Comparative analysis of the average values of visual memory development in students (girls and boys) of higher education institutions who did not play sports, with different blood groups, $X\pm m$, ($n=425$).

Memory function indicators	Statistical indicators	Blood groups			
		O(I)	A(II)	B(III)	AB(IV)
Girls (1)					
Number of errors, units.	$X\pm m$	n=62	n=67	n=53	n=31
		1,7±0,20	2,4±0,19	2,4±0,26	2,3±0,34
Score, points	$X\pm m$	8,4±0,17	7,7±0,16	7,7±0,23	7,8±0,30
Boys (2) [28]					
Number of errors, units.	$X\pm m$	n=67	n=65	n=45	n=35
		2,0±0,19	2,6±0,23	2,5±0,30	2,6±0,41
Score, points	$X\pm m$	8,1±0,16	7,6±0,19	7,7±0,26	7,6±0,32
Number of errors, units.	P1–P2	>0,05	>0,05	>0,05	>0,05
Score, points	P1–P2	>0,05	>0,05	>0,05	>0,05

was found between individuals with 0(I) and AB(IV) blood groups ($P>0.05$). Similarly, to female students-athletes (see Table 4), in female students who also did not play sports, there was no significant difference in the mean values of this function between individuals of A(II), B(III) and AB(IV) blood groups ($P>0.05$). Therefore, in our opinion, it can be assumed that students with blood group 0(I) have the best associative links with visual memory function, while the worst ones cannot be determined for sure.

A comparative analysis of the average values of visual memory development in young athletes (experimental group), pupils of general education institutions who did not engage in sports and non-athletes (general control group), considering sexual dimorphism, is presented in Tables 6, 7 and 8.

It follows from the data of these tables that according to the average values of indicators of the function of short-term visual memory (the number of errors made, the overall assessment of the function) between adolescent girls and boys of a specialised sports institution who were involved in different sports (Table 6), their peers - girls and boys who did not play sports (Table 7), and students (girls and boys) (Table 8). 6), their peers - girls and boys who did not play sports (Table 7), and students (girls and boys) (Table 8), no statistically significant differences were found ($P>0.05$ in all cases). The above, in our opinion, is an indisputable fact that the factor of sexual dimorphism does not make significant adjustments to the specifics of changes in the indicators of visual memory function of young people of different ages and social employment.

Discussion.

The analysis of changes in the above indicators of visual memory function depending on serological markers of blood groups in girls aged 13-15 years both with and without taking into account the orientation of their training process shows the absence of statistically significant differences between the subjects of all four blood groups of the ABO system ($P>0.05$), although the tendency to improve the arithmetic mean indicators is clearly observed in girls of different sports who have 0(I) blood group. In view of the above, it can be assumed that genetic markers of blood groups are less informative in predicting the development of short-term visual memory function in female athletes than in their peers - girls who did not engage in sports and female non-athletic students of adolescent age (see below).

The fact that pupils and students of blood group 0(I) who did not engage in sports recorded significantly better (than other individuals) average indicators of visual memory function once again suggests that it is individuals of blood group 0(I) who have the best associative relationship with visual memory properties, while the worst relationship remains unclear. It can also be assumed that the properties of the visual memory function, as well as those properties that we studied earlier (attention, time perception, logical thinking) [28-30], are more pronounced in youth than in adolescence.

And finally, the data of gender comparative analysis of the average values of the development of visual memory function in athletes and pupils and students who did not engage in sports indicate that there are no significant differences between boys

and girls (although the tendency to improve the development of visual memory function is clearly observed in girls with blood group 0(I)). Therefore, it can be assumed that we have not found any mental peculiarities of sexual dimorphism in the development of visual memory in young people (some of whom are engaged in sports and others are not).

Theoretical and practical relevance of the work.

The theoretical basis of many years of research is the provisions and conclusions of a number of authors (Khoroshukha M., Lyshevska V., Serhiynko L., Shepoval S., Strikalenko E. et al.) on the possibilities of using serological markers of blood groups of the ABO system in genetic prediction of the development of motor skills and basic mental properties (attention, perception, thinking, memory) of people of different ages, sexes, and professional employment. The practical significance of the work lies in the possibilities of carrying out professional psychophysiological selection of young athletes for those sports for which visual memory, as one of the mental properties of a person, plays an important role in the growth of sportsmanship (for example, orienteering, game sports (in particular, mini-football), shooting, sports poker, etc.), as well as in the selection of military personnel, respectively, for those specialities that require rapid visual (auditory) perception, motor, operational and visual memory.

Conclusion.

The use of serological markers of blood groups according to the ABO system is possible in the genetic prediction of the development of visual memory in pupils and students. However, associative links with the development of this function are more pronounced in adolescent girls and young women students who do not play sports than in young women athletes. In general, we conclude that individuals with blood type 0(I) have the best associative links with short-term visual memory properties, while the worst link cannot be determined for sure. No gender differences were found between the subjects (athletes, pupils, students), although a tendency to improve the development of visual memory function is clearly observed in girls with blood group 0(I).

Conflicts of interest.

The authors report no conflicts of interest.

REFERENCES

1. Kandel ER. The Molecular Biology of Memory Storage: A Dialog Between Genes and Synapses. *Bioscience Reports*. 2001;21:565-611.
2. Friedman GN, Johnson L, Williams ZM. Long-Term Visual Memory and Its Role in Learning Suppression. *J. Front. Psychol*. 2018;12:1896.
3. Olivers CNL, Stigchel SV. Future steps in visual working memory research. *J. Visual Cognition*. 2020;28:325-329.
4. Наталія Доброштан. Вікові особливості у дослідженнях видів і процесів пам'яті. *Вісник Львівського університету. Серія психологічні науки*. 2020;7:37-44.
5. Brisswalter J, Collardeau M, Rene A. Effects of acute physical exercise characteristics on cognitive performance. *Sports Medicine*. 2002;32:555-566.

6. Георгій Коробейніков, Євген Приступа, Леся Коробейнікова, Юрій Бріскін. Оцінювання психофізіологічних станів у спорті : монографія. Л.: ЛДУФК. 2013:312.
7. Лебедев С.І, Тюрін О.Ю. Вплив тренувального процесу за програмою дитячо-юнацької середньої школи на психофізіологічні якості футболістів 10–12 років. Слобожанський науково-спортивний вісник. 2016;1:38-42.
8. Макуц Т.Б. Особливості прояву уваги у тенісистів 14-15 років та її вплив на ефективність змагальної діяльності. Науковий часопис Національного педагогічного університету імені М.П. Драгоманова. Серія № 15. «Науково-педагогічні проблеми фізичної культури (фізична культура і спорт)». 2015;12:82-85.
9. Лукавенко Є.Г. Розвиток інтелектуальних здібностей студентів за допомогою спортивного орієнтування. Педагогіка, психологія та медико-біологічні проблеми фізичного виховання і спорту. 2002;28:22-26.
10. Кожанова О.С, Нестерова Т.В. Відбір спортсменок у команди з групових вправ художньої гімнастики : монографія. К.: Київ. ун-т ім. Б. Грінченка. 2018:152.
11. Ясько Л.В, Головач І.І. Характеристика короткочасної зорової пам'яті та властивостей уваги студентів різних спеціальностей (з урахуванням занять фізичним вихованням). Здоров'я, фізичне виховання і спорт: перспективи та кращі практики: матер. Міжнарод. наук.-практ. конф. Київ. 2018:182-184.
12. Seabra A, Mendonca D, Maia J, et al. Gender, weight status and socioeconomic differences in psychosocial correlates of physical activity in school children. *Journal of Science and Medicine in Sport*. 2013;16:320-326.
13. Давидова О.М. Стан властивостей основних нервових процесів, функцій пам'яті та уваги в учнів старшого шкільного віку : автореф. дис. ... канд. біол. наук : 03.00.13. Київ. 1997:22.
14. Кравченко О.К. Стан властивостей основних нервових процесів, функцій пам'яті та уваги у людей зрілого та похилого віку : автореф. дис. ... канд. біол. наук : 03.00.13. Київ. 2008:18.
15. Макаренко М.В, Лизогуб В.С. Онтогенез психофізіологічних функцій людини. Черкаси : Вертикаль, видавець ПП Кандич С. Г. 2011:256.
16. Хорошуха М.Ф. Особливості змін функції пам'яті у юних спортсменів 13–16 років в залежності від спрямованості їх тренувального процесу. Науковий часопис Національного педагогічного університету імені М.П. Драгоманова. Серія № 15. «Науково-педагогічні проблеми фізичної культури (фізична культура і спорт)». 2016;01:87-90.
17. Khoroshukha M, Lopatenko G, Prysyzhnyuk S, et al. The Impact of Training Efforts of Various Focuses on the Development of the Function of the Visual Memory of Student-Athletes of 17-20 Years Old High Schools of Physical Culture. *International Journal of Applied Exercise Physiology*. 2019;8:225-231.
18. Fitzpatrick C, Pagani L.S. Toddler working memory skills predict kindergarten school readiness. *Intelligence*. 2012;40:205-212.
19. Friso-van den Bos I, van der Ven S. H. G, Kroesbergen E.H, et al. Working memory and mathematics in primary school children : A meta-analysis. *Educational Research Review*. 2013;10:29-44.
20. Strikalenko E.A, Serhiynko L.P, Serhiynko L.I. Blood groups and physical development of a person. *New ideas in sport sciences*. 2003:229-231.
21. Strikalenko E, Serhiynko L. Blood groups in the system of prognosis of children's predisposition to the sports activity. *Sport kinetics*. 2003:125.
22. Сергієнко Л.П. Актуальні психологічні проблеми спортивного відбору. Вісник Чернігівського державного педагогічного університету імені Т.Г. Шевченка. [Текст]. Серія: Педагогічні науки. Фізичне виховання та спорт. Чернігів: ЧДПУ. 2007;44:99-105.
23. Mykhailo K, Sergiy P, Lyudmyla S, et al. Influence of blood types serologic markers on development of concentration function of young 13–16 year old athletes. *Journal of Physical Education and Sport*. 2018;18:1890-1895.
24. Mykhailo K, Sergiy P, Lyudmyla S, et al. Peculiarities of using blood types serologic markers for the development of time perception function of young athletes aged 13–16. *Journal of Physical Education and Sport*. 2019;19:567-572.
25. Mykhailo K, Sergiy P, Lyudmyla S, et al. Influence of blood type serologic markers on development of the function of logical thinking of athletes aged 17–20. *Journal of Physical Education and Sport*. 2019;19:1060-1065.
26. Khoroshukha MF, Griban GP, Bosenko AI, et al. Influence of serological markers of blood groups upon the development of visual memory in high schoolers and students. *Wiadomości Lekarskie Medical Advances*. 2023;76:1464-1469.
27. Алгоритм роботи військового психолога щодо психологічного забезпечення професійної діяльності особового складу Збройних Сил України (методичні рекомендації) / Міністерство оборони України, Наук. -дослід. центр гуманітар. проблем Збройних Сил України: Н.А. Агаєв, О.Г. Скрипкін, А.Б. Дейко, В.В. Поливанюк, О.В. Еверт. К.: НДЦ ГП ЗС України. 2016:147.
28. Khoroshukha M, Ivashchenko S, Bosenko A, et al. Gender features of the effects of serological markers of blood groups on the development of attention function of young adolescent athletes. *Georgian Medical News*. 2020;7-8:103-111.
29. Khoroshukha M, Bosenko A, Tymchyk O, et al. Research of peculiarities of development of time perception function in 13-15-year-old athletes with different blood groups. *Georgian Medical News*. 2020;10:142-149.
30. Khoroshukha M, Bosenko A, Prysiazhniuk S, et al. Influence of sexual dimorphism on the development of the logical thinking function in young athletes aged 13–15 years with different blood groups. *Georgian Medical News*. 2020;12:108-114.
31. Макаренко Н.В, Пухов В.А, Кольченко Н.В. и др. Основы профессионального психофизиологического отбора. К.: Наукова думка. 1987:244.