

GEORGIAN MEDICAL NEWS

ISSN 1512-0112

№ 7 (328) Июль Август 2022

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 შედეგების 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.

Содержание:

Moiseienko Anatolii. LAPAROSCOPIC HERNIOPLASTY IN THE SURGICAL TREATMENT OF VENTRAL HERNIA.....	6
Koval S.M., Snihurska I.O., Yushko K.O., Mysnychenko O.V., Lytvynova O.M. QUANTITATIVE CHARACTERISTICS OF GUT MICROBIOTA IN PATIENTS WITH ARTERIAL HYPERTENSION.....	11
Kamilova U.K., Abdullaeva Ch.A., Zakirova G.A., Tagaeva D.R., Masharipova D.R. ASSESSMENT OF KIDNEY DYSFUNCTION IN PATIENTS WITH CHRONIC HEART FAILURE.....	16
S. Zubchenko, A. Havrylyuk, M. Lomikovska, I. Kril, S. Chuiko. DIAGNOSIS OF AN ALLERGIC REACTION TO ANTIBIOTICS IN AN PATIENT WITH ACTIVE HUMAN HERPESVIRUS -4, -6 TYPE INFECTION (CLINICAL CASE)	21
Gromnatska N., Kiselova M., Adegbile T. EARLY PROGNOSIS OF HYPOGALACTIA IN BREASTFEEDING MOTHERS: NEW OPPORTUNITIES FOR PRIMARY PREVENTION.....	27
M.V. Polulyakh, S.I. Gerasimenko, D.M. Polulyakh, A.N. Kostyuk, I.V. Huzhevskiy. ARTHROPLASTY IN DYSPLASATIC COXARTHROSIS.....	34
Badalyan K., Posessor A., Stepanyan Z., Levonyan E., Melkumyan I. USE OF VOLUME-STABLE COLLAGEN MATRIX FOR SOFT TISSUE AUGMENTATION AT TEETH AND DENTAL IMPLANTS SITE	38
Osinskaya T.V., Zapolsky M.E., Lebedyuk M.N., Shcherbakova Y.V., Dzhoraeva S.K. PREVALENCE OF THE HERPES SIMPLEX VIRUS (TYPES 1 AND 2) AMONG PATIENTS IN THE PLACES OF DETENTION.....	43
Sartayeva A.Sh, Danyarova L.B., Begalina D.T, Nurgalieva Zh.Zh, Baikadamova L.I, Adilova G.E. GESTATIONAL DIABETES: PREVALENCE AND RISKS FOR THE MOTHER AND CHILD (REVIEW).....	47
Maruta N.A, Atramentova L.A, Utevskaia O.M, Panko T.V, Denisenko M.M THE RECURRENT DEPRESSIVE DISORDERS IN THE VIEW OF THE GENEALOGICAL COMPONENT ESTIMATION.....	53
Shkrobot Svitlana, Budarna Olena, Milevska-Vovchuk Lyubov, Duve Khrystyna, Tkachuk Nataliya, Saliy Maryna. OPTIC NEUROMYELITIS: CASE REPORT AND REVIEW.....	58
Lykhota K., Petrychenko O., Mykhailovska L., Kutsiuk T., Malashenko N. TREATMENT OF SAGITAL ANOMALIES IN A MIXED DENTITION IN CHILDREN WITH SPEECH DISORDERS.....	63
Kuntii A., Blahuta R., Avramenko O., Shehacov R., Marko S. PSYCHOLOGICAL-FORENSIC CHARACTERISTICS OF THE PERSON WHO COMMITTED A PREMEDITATED MURDER IN A STATE OF STRONG COMMOTION.....	69
Saba Abdul Salam Hamid Al-Sultan, Inam Abdulmonem Abdulhameed, Shymaa Faysal Yonis, Yasser Hamid Thanoon. RELATIONSHIP BETWEEN SOME INFLAMMATORY MARKERS AND BACTERIAL INFECTIONS AMONG COVID-19 PATIENTS.....	75
Olga V. Gancho, Tetiana M. Moshel, Olga M. Boychenko, Tetiana D. Bublil, Oleksii P. Kostyrenko, Ivan Yu. Popovich, Svitlana V. Kolomiyets, A. Krutikova. HERBAL MEDICINES ANTIMICROBIAL EFFECT.....	81
Bodnia I.P, Pokhil S.I, Bodnia K.I, Pavliy V.V, Skoryk L.I. DISTRIBUTION AND FREQUENCY OF BLASTOCYSTIS SP. BY METHODS OF MICROSCOPY AND CULTIVATION IN FAECES OF RESIDENTS OF KHARKOV REGION.....	85
Stepanyan L, Asriyan E. PSYCHOPHYSIOLOGICAL CORRELATES OF STUDENTS' WELL-BEING IN ARMENIA.....	90
Natalia Whitney, Annie Fritsch, Alireza Hamidian Jahromi. EVALUATION OF SEXUAL FUNCTION IN TRANSGENDER AND GENDER DIVERSE INDIVIDUALS; A CALL FOR ACTION.....	97
Hadeel Anwar Alsarraje. COVID-19 INFECTION IN THIRD TRIMESTER OF PREGNANCY AND OBSTETRIC OUTCOMES.....	100

Rybalov M.A, Borovets S.Yu, Petlenko S.V, Krasnov A.A, Apryatina V.A. INFLUENCE OF ADDING ZINC ARGINYLE-GLYCINATE TO IMPROVE EFFICACY OF BIOREGULATORY PEPTIDES OF THE PROSTATE GLAND IN TREATMENT OF PATIENTS WITH IMPAIRED SPERM PARAMETERS.....	108
Hany Khairy Mansour, Khaled Mahmoud Makboul, Salah Hussein Elhalawany, Baher Emil Ibrahim, Dina Ahmed Marawan A STUDY OF THE ASSESSMENT OF SERUM ADROPIN LEVEL AS A RISK FACTOR OF ISCHAEMIC HEART DISEASE IN TYPE 2 DIABETES MELLITUS CASES.....	115
Valentyn I. Maslovskiy, Iryna A. Mezhiievskaya FEATURES OF ANATOMICAL LESIONS OF CORONARY ARTERIES DEPENDING ON THE LEVELS OF ST2 AND TROPONIN I IN BLOOD PLASMA IN PATIENTS WITH NSTEMI.....	118
Nikitenko R.P. SENTINEL LYMPH NODES DETECTION METHOD IN BREAST CANCER.....	122
Kamilov Kh.P, Kadirbaeva A.A, Rakhimova M.A, Lukina G.I, Abramova M.Ya, Lukin A.V, Alimova A.V. DISEASES OF THE ORAL MUCOSA IN PATIENTS IN THE POST-COVID PERIOD.....	127
Nakonechna O.A, Vyshnytska I, Vasylyeva I.M, Babenko O.V, Voitenko S.A, Bondarenko A.V, Gargin V. THE SIGNIFICANCE OF ISCHEMIA FOR THE PROLIFERATIVE ACTIVITY OF THE MUCOSA IN INFLAMMATORY BOWEL DISEASES.....	133
Lyazzat T. Yerallyeva, Assiya M. Issayeva, Gulnur Z. Tanbayeva. PNEUMONIA AMONG CHILDREN UNDER 1 YEAR OF AGE: ANALYSIS OF INCIDENCE AND HOSPITAL MORTALITY FROM 2010 TO 2020 IN THE REPUBLIC OF KAZAKHSTAN.....	138
Rudyk Iu.S., Pyvovar S.M. THE USE OF β -ADRENOBLOCKERS IN PATIENTS WITH HEART FAILURE AND CONCOMITANT THYROID DISEASE (LITERATURE REVIEW AND OWN OBSERVATIONS)	141
Baidurin S.A, Bekenova F.K, Tkachev V.A, Shugaipova K.I, Khusainova G.S. CLINICAL AND FUNCTIONAL STATE OF THE THYROID GLAND IN WOMEN OF PERI- AND POSTMENOPAUSAL AGE WITH METABOLIC SYNDROME.....	148
Romanyuk L., Malinovska L., Kravets N., Olyinyk N., Volch I. ANALYSIS OF ANTIBIOTIC RESISTANCE OF CONDITIONALLY PATHOGENIC OROPHARYNGEAL MICROFLORA IN CHILDREN AFTER VIRAL RESPIRATORY INFECTIONS.....	154
Yunin Oleksandr, Shevchenko Serhii, Anheloniuk Anna-Mariia, Tymoshenko Yurii, Krupiei Viktoriia. DESCRIPTION OF PROVING INTENTIONAL HOMICIDES INVOLVING POISONOUS SUBSTANCES: THE RELATIONSHIP OF MEDICAL AND PROCEDURAL CONTEXTS.....	158

HERBAL MEDICINES ANTIMICROBIAL EFFECT

Olga V. Gancho, Tetiana M. Moshel, Olga M. Boychenko, Tetiana D. Bublil, Oleksii P. Kostyrenko, Ivan Yu. Popovich, Svitlana V. Kolomiyets, A. Krutikova.

Poltava State Medical University, Poltava, Ukraine.

Abstract.

The aim. To study and compare the sensitivity of museum strains of microorganisms to the herbal medicines.

Materials and Methods. Standard strains of *S. aureus* ATCC 25923, *S. epidermidis* ATCC 14990, *E. faecalis* ATCC 29212, *E. coli* ATCC 25922 and *C. albicans* ATCC 10231 were used for the microbiological examination. Antimicrobial activity of the herbal medicines was studied by the disk diffusion method and serial dilutions method according to European Committee on Antimicrobial Susceptibility Testing.

Results. According to the obtained results *E. coli* standard strain is maximally sensitive to tymsal. *Enterococci* were statistically significant high sensitive to panavir only. Museum strain of *S. epidermidis* was 2.17 more sensitive to tymsal than to chlorhexidine control ($p < 0.05$). Yeast like fungi standard strain was the most sensitive to proteflazid. Growth inhibition zone was showing the sensitiveness of *C. albicans* to this herbal medicine, the fungicidal activity was statistically significantly higher than chlorhexidine effect in 1.2 times ($p < 0.05$).

Conclusions. Analysis of microorganism's sensitivity to the herbal medicines action had showed the best antimicrobial activity of herbal medicines tymsal, panavir and proteflazid compared to traditional drugs.

Key words. Herbal medicines, bacteria sensitivity, antimicrobial effect, oropharyngeal diseases.

Introduction.

Herbal medicines are widely used in medicine due to their natural composition, complementary action, high safety, possibility of using in children under 5 years old and in women during pregnancy and lactation. They show an antiseptic and anti-inflammatory action and have a great difference with synthetics medicines such as lack of antigenic features and side effects. In this regard, plant natural products may offer a great potential and hope in oropharyngeal diseases treatment [1]. There are numerous examples of medicinal plants species which are currently the most often used in folk and official medicine in Ukraine and other countries for the treatment of oral candidiasis, periodontal and mucous membrane diseases [1-3]. Herbal medicines have a regulatory and normalization effect. They are easy to digest, nontoxic, do not cause side effects and allergic reactions. Biologically active substances contained in herbal extract are cause a pronounced therapeutic and preventive effect, stimulate regeneration processes, modulate immune reactivity of the human organism, and support the natural body colonization resistance [4-6].

Some of the herbal remedies are widely used in otolaryngology, it is assumed that they can be effective in the dental practice too [7-9]. Even «in the antimicrobial therapy of denture stomatitis,

it is desirable to inhibit the growth of not only the primary causative organism, *Candida albicans*, but also other oral bacteria closely associated with the condition» [10].

In turn, the extensive use of antibiotics has resulted in antibiotic resistance that has been reported to be particularly pronounced among opportunistic species. Through the last decades facing the challenge of growing antibiotic resistance, scientists are seeking new options of antimicrobial agents, and thereupon the use of plant sources seems to be promising. This directs the attention toward the medicines, whose active ingredients approaches in developing new drugs to treat and prevent oral infectious and inflammatory diseases [7].

Thus, it is great significance to study sensitivity of microorganism's stains that can colonize the oral and respiratory tract mucosa in cases of infectious and inflammatory diseases and can cause opportunistic infections under certain conditions, to the medicine mentioned above in terms of searching for new antibacterial agents.

Some antimicrobial plants' compounds are possible therapeutic alternatives to antibiotics with unavoidable side effects.

So, the possibilities of use of medicinal plants and groups of compounds with antibacterial, antifungal, and antiviral activity in the treatment of oropharyngeal diseases have been discussed. In this regard, new formulations of antimicrobials, combination therapies and development of new bioactive compounds might be useful for a better therapeutic outcome. This work is an attempt to create a modern system of information about antimicrobial activity of plants' medicines.

Aim.

This study was aimed to compare the sensitivity of museum strains of microorganisms to the medicines that are produced from medicinal plants extracts base for the best choice of oropharyngeal diseases treatment.

Materials and Methods.

We have chosen for our study the herbal medicines that are traditionally used for oropharyngeal diseases treatment: tymsal, chlorophyllipt and compare their antimicrobial action with herbal antiviral pharmacological agents: panavir and proteflazid.

Tymsal (Herbapol Krakow, Poland). Extract of *Thymus vulgaris* (thyme) and sage is used as a medicine for the local therapy of otorhinolaryngological diseases, it have comprehensive, anti-inflammatory, and antiseptic action and consists of 0,7 mg/ml thymol, extracted from *Thymus vulgaris* (thyme) and 0,03 mg/ml of *Salvia officinalis* in 40 % alcohol. Thyme has a beneficial effect on airways. Sage contributes to soothing irritation of a throat, larynx and vocal cords and supports the natural body immunity. This extract contains 0,73 mg/ml terpenoids as an active substance.

Chlorophyllipt (Arterium, Ukraine) is a medicine by natural origin, which belongs to the group of antiseptics, widely used in otolaryngology. 10 mg/ml phytoncide extracted from the eucalyptus tree leaves in 96% alcohol is the main component of the medicines.

Panavir (Zelenaya Dubrava, Russia) is the original antiviral medicines of plant origin with a wide spectrum of antiviral action. It is used in the treatment of herpetic lesions of the oral mucous membrane and red border of lips. The substance contains 0,2 mg/ml of biologically active hexose glycoside, extracted from the *Solanum tuberosum*.

Proteflazid (Ecopharm, Ukraine) extract obtained from wild *Calamagrostis epigeios L.* and *Deschampsia caespitosa L.* by extracting of 0,3 mg/ml stable molecular complexes of tricine, apigenin, luteolin, and quercetin in 96% alcohol. This extract possesses specific antiviral properties against numerous viruses, and its direct action consists of the inhibition of DNA-virus synthesis in infected cells by reducing the activity of virus-specific enzymes of DNA polymerase and thymidine kinase. Proteflazid extract is known for its bactericidal action against some gram-positive and gram-negative microorganisms and fungi [7].

It was studied antimicrobial activity of the antiviral preparations proteflazid and panavir in comparison with similar effect of traditional plant antiseptics tymzal and chlorophyllipt. We have chosen 0,05% chlorhexidine bigluconate water solution as a basic antiseptic, which is used usually in dentistry as a control.

Standard strains of gram-positive bacteria *S. aureus* ATCC 25923, *S. epidermidis* ATCC 14990, *E. faecalis* ATCC 29212, gram negative bacteria *E. coli* ATCC 25922 and yeast-like fungi *C. albicans* ATCC 10231 were used for the microbiological examination. Museum strains of the golden and epidermal staphylococci, enterococci, colon bacilli and yeast-like fungi were obtained from the Institute of epidemiology and infectious diseases named by L. V. Gromashevskiy, Ukraine.

The sensitivity assessment of the museum strains to herbal medicines and 0,05% chlorhexidine bigluconate (Red star, Ukraine) was done by double serial dilutions according to the standard procedure approved by CLSI. ISO/TC 212 Clinical laboratory testing and in vitro diagnostic test systems [11].

Each extract studied was diluted in the volume of 1 cm³ with final microorganism culture concentration of approximately 5 x 10⁵ CFU (colony forming unit)/sm³. For inoculation we used microbial suspension equivalent to 1.0 by McFarland Equivalence Standards, diluted 1/100 in saline, and then the concentration of microorganisms in this suspension was 3 x 10⁶ CFU / cm³. Inoculum taken in a dose of 0.1 cm³ was brought into each test tube containing 1,0 cm³ of appropriate dilutions of process solution, and into a test tube with 1.0 sm³ of the broth medium without the herbal extract, to have so-called "negative control". Inoculum was brought in the test tubes with dilutions immediately after having been prepared.

The test tubes were incubated in a normal atmosphere at the temperature 37° C for 20-24 hours. Bactericidal minimum concentration was identified by inoculating of the microorganisms from the broth medium into the agar medium (State Research Institute of Food Resources, National Academy of Agricultural Sciences of Ukraine) and Sabraud agar

(Pharmactiv, Ukraine) for *C. albicans* cultivation. Cultures of the microbial species were incubated in a normal atmosphere at a temperature 37° C for 20-24 hours. To determine the growth of the microorganisms, the test tubes with the cultures were not evaluated in transmitted light, unlike the "negative" control, because the mixing of broth medium and the solution containing some plant extracts, for example, flavonoids causes the turbidity. By taking this into the account, we only determined minimum bactericidal concentration (MBC) of herbal medicines by inoculating the microorganisms from broth medium into the agar medium.

Undiluted solutions of each herbal substance in a quantity of 1000 µg/disc were put on the standard paper discs (6 mm in diameter) to determine the sensitivity of the museum strains of microorganisms by disk-diffusing method [12]. 0.05% aqueous solution of antiseptic chlorhexidine bigluconate was applied to the standard paper discs in quantities of 25 mcg/disc. Cultures of microorganisms were inoculated onto the surface of the solid nutrient medium and indicator discs were put after drying. The Petri plates were incubated in the thermostat during 24 hours at a temperature of 37°C. Growth inhibition zone of microorganisms was measured by using calipers, which are clearly contrasted against the background of microbial growth around the disks. These studies were repeated five times.

Statistical data processing was performed using Microsoft Excel 2010. Statistical significance was determined by Student's t-criterion. Data were statistically significant at p<0.05.

Results and Discussion.

The results of the comparative analysis of antimicrobial activity of herbal medicines by the serial dilution method are shown in table I.

Tymzal did produce the best antibacterial effect to the museum strain of *E. coli*, *E. faecalis* and both of standard strains of staphylococci. Antibacterial activity of tymzal was 14.9 times higher (p<0.001) to colon bacilli, (p<0.001), 14.3 times more (p<0.001) to golden staphylococci and 10.7 times higher (p<0.001) to epidermal staphylococci compared with the chlorhexidine control. Antifungal effect of this herbal substance was 2.8 times higher (p<0.01) than control.

Other herbal medicines were show the same action to *C. albicans* in 2.5 times more (p<0.05) than to chlorhexidine exclude chlorophyllipt. Chlorophyllipt substance had the less effect to the all-museum microorganism strains compared with all other herbal medicines and the chlorhexidine control.

Enterococci were the most sensitive to panavir (MGID is 7.4±3.1 mcg/ml) and it was 5.9 more (p<0.01) than to chlorhexidine control (MGID is 43.6±16.9 mcg/ml).

Antimicrobial activity of herbal preparation panavir to *E. coli* was revealed in 12.5% solution. It was 3.2 times more (p<0.05) than to chlorhexidine and less in 4.6 times than tymzal effect on colon bacilli.

The results of the antimicrobial action comparative analysis of undiluted herbal preparations were studied with use of disc-diffusion method are presented in the table II.

According to the obtained results *E. coli* standard strain was maximally sensitive to tymzal. Growth inhibition zone was showing the high sensitiveness of colon bacilli and was

Table 1. Comparative characteristic of the herbal medicines antimicrobial activity, the serial dilution method, minimal growth inhibition dose (MGID), mcg/ml.

Medicines	Microorganism strain minimal growth inhibition dose, mcg/ml n=5				
	<i>E. coli</i> ATCC 25922	<i>E. faecalis</i> ATCC 29212	<i>S. aureus</i> ATCC 25923	<i>S. epidermidis</i> ATCC 14990	<i>C. albicans</i> ATCC 10231
Tymsal thymol	2.5±0.9*	19.8±8.9*	3.5±1.4*	2.9±1.1*	39.5±10.9*
Chlorophyllipt phytoncide	350±135	400±137	175±60.2	225.0±55.9	450±112
Proteflasid complex	75±20.3	135±33.5	105±41.1	60.2±20.1	45.4±16.5*
Panavir hexose glycoside	11.6±3.8*	7.4±3.1*	80±27.4	90±22.4	45±20.2*
Chlorhexidine 0,05% solution	37.2±13.9	43.6±16.9	49.9±17.0	31.0±10.1	112.5±28.2

Note: * – significant difference in performance between herbal medicines antimicrobial effect and chlorhexidine control ($p<0.05$).

Table 2. Comparative characteristic of antimicrobial activity of the herbal medicines, the disc diffusion method, $M\pm m$.

Medicines	The zone of microorganism strain growth inhibition, mm n=5				
	<i>E. coli</i> ATCC 25922	<i>E. faecalis</i> ATCC 29212	<i>S. aureus</i> ATCC 25923	<i>S. epidermidis</i> ATCC 14990	<i>C. albicans</i> ATCC 10231
Tymsal thymol	28.3±3.3*	16.2±0.4	25.8±2.9	26.7±3.4*	19.8±2.1*
Chlorophyllipt phytoncide	7.8±0.2	7.3±0.8	9.7±0.9	8.3±0.7	6.9±0.1
Proteflasid complex	12.0±0.71	11.6±0.5	14.2±2.5	14.1±2.1	18.2±1.3*
Panavir hexose glycoside	22.2±2.1	30.5±3.4*	7.3±0.8	10.3±0.5	15.2±2.9
Chlorhexidine 0,05% solution	20.6±3.2	14.6±2.1	23.3±2.9	12.3±2.1	14.2±2.5

Note: * – significant difference in performance between herbal medicines antimicrobial effect and chlorhexidine control ($p<0.05$).

statistically significant in compare with chlorhexidine control ($p<0.05$). *Enterococci* were statistically significant highly sensitive to panavir only. Growth inhibition zone was more than chlorhexidine control in 2.1 times ($p<0.05$). Museum strain of *S. epidermidis* was 2.2 more sensitive to tymsal than to chlorhexidine control ($p<0.05$). Yeast like fungi standard strain was the most sensitive to proteflazid. The fungicidal activity of this herbal medicine was statistically significantly higher than chlorhexidine effect in 1.2 times ($p<0.05$).

So, undiluted tymsal also was the most active against *E. coli* and epidermal staphylococci in comparison to other plant medication and chlorhexidine control. Panavir was the most effective medication against the museum strain of *Enterococcus*, antibacterial effect was 2,1 times exceeded the activity of chlorhexidine control ($p<0.05$). Proteflasid and tymsal have the best antifungal effect among all herbal remedies and did show the fungicidal activity which was higher than chlorhexidine effect in 1.2 times and 1.4 times ($p<0.05$).

These results obtained with help of disc diffusion method were confirmed the data when the serial dilution method was used. According to the obtained data, the choice of the method does not affect the test result in terms of "antimicrobial activity" and it only depends on the characteristics of the sample. So, the results of the evaluation by the two methods did not significantly differ among themselves. As the serial dilution method is the most sensitive for minimal microbial growth inhibition concentration detection as the disc diffusion method is the most effective for the best choice of medicine for oropharyngeal diseases treatment.

Conclusions.

1. Tymsal can produce the maximal antimicrobial effect to the strains of gram-negative bacteria *E. coli* ATCC 25922,

gram positive cocci *E. faecalis* ATCC 29212, *S. aureus* ATCC 25923 and *S. epidermidis* ATCC 14990. This herbal medicine antimicrobial effect is statistically significantly higher than the controls chlorhexidine index and other herbal medicines ($p<0.05$).

2. Panavir is the most effective herbal medicine against the museum strain of *E. faecalis* ATCC 29212. This medicine antimicrobial effect is statistically significantly higher than the controls chlorhexidine and other herbal medicines ($p<0.05$).

3. Tymsal, panavir and proteflasid have the same antifungal effect to standard strain *C. albicans* ATCC 10231 which was statistically significantly higher than the chlorhexidine ($p<0.05$).

4. Both of standard methods for antimicrobial activity study are effective for the choice of the best medicines during infectious and inflammatory diseases treatment.

5. So, tymsal, panavir and proteflasid can be useful for the oropharyngeal diseases treatment if they are caused by the same species of microorganisms as the standard strains were used.

REFERENCES

- Vorobets NM, Rivis OYu. Aktualnost i perspektivy ispolzovaniya lekarstvennykh rasteniy dlya lecheniya kandidoza polosti rta [Actuality and perspectives of using medicinal plants for the treatment of oral candidiasis]. Visnyk problem biolohiyi i medytsyny. 2017;1:22-32.
- Khin M, Jones AM, Cech NB, Caesar LK. Phytochemical Analysis and Antimicrobial Efficacy of *Macleaya cordata* against Extensively Drug-Resistant *Staphylococcus aureus*. Natural Product Communications. 2018;13:1479-1483.
- Mihaylova AB, Vavilova TP, Gorbatoeva EA Innovatsionnyie preparaty rastitel'nogo proishozhdeniya v kompleksnom

- lechenii kataralnogo gingivita [Innovative preparations of the herbal origin in the catarrhal gingivitis complex treatment]. *Maestro Stomatologii*. 2013;1:74-78.
4. Petrushanko TA, Chereda VV, Loban' GA. Rol kolonizatsionnoy ustoychivosti rotovoy polosti v razvitii kariesa zubov [Role of oral cavity colonization resistance in dental caries development]. *Stomatologiya*. 2013;92:43-50.
 5. Petrushanko TA, Tchereda VV, Loban GA. Skringovaya diagnostika mikroekologicheskikh narusheniy polosti rta [The screening diagnostic of micro ecological disorders of oral cavity]. *Klin Lab Diagn*. 2014;6:48-50.
 6. Petrushanko TA, Chereda VV, Loban' GA. The relationship between colonization resistance of the oral cavity and individual -typological characteristics of personality: dental aspects. *Wiad Lek*. 2017;70:754-757.
 7. Ananieva MM, Faustova MO, Basarab Ya O, Loban' GA. Antimicrobial effect of proteflazid extract on microflora of peri-implant areas in infectious and inflammatory complications after dental implantation. *Zaporozhskiy meditsinskiy zhurnal*. 2017; 6:809-812.
 8. Faustova MO, Anan'yeva MM, Basarab IO. Bakterytsydna ta funhitydna aktyvni' ekstraktu proteflazydu shchodo muzeynykh shtamiv mikroorhanizmiv *Staphylococcus aureus* ATCC 25923, *Staphylococcus epidermidis* ATCC 14990, *Escherichia coli* ATCC 25922, *Streptococcus faecalis* ATCC 29212, *Micrococcus luteus* ATCC 4698, *Candida albicans* ATCC 10231. *Aktual'ni problemy suchasnoyi medytsyny*. 2016;4:72-74.
 9. Ananieva MM, Faustova MO, Basarab IO, Loban' GA. *Kocuria rosea*, *Kocuria kristinae*, *Leuconostoc mesenteroides* as caries-causing representatives of oral microflora. *Wiad Lek*. 2017;70:296-298.
 10. Faustova MO, Ananieva MM, Basarab IO, Loban' GA. Neutrophil bactericidal activity through the stages of placement of different dental implants depending on their chemical composition. *Wiad Lek*. 2017;70:921-924.
 11. CLSI. ISO/TC 212 Clinical laboratory testing and in vitro diagnostic test systems. 2021.
 12. European Committee on Antimicrobial Susceptibility Testing. European antimicrobial breakpoints. Basel: EUCAST, 2021.