

GEORGIAN MEDICAL NEWS

ISSN 1512-0112

NO 2 (347) Февраль 2024

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, ანათალებების 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.

Yu-Ri Choi, Su-Bin Yu, Seoul-Hee Nam. ANTIBACTERIAL EFFECT OF CRATAEGUS PINNATIFIDA EXTRACT AGAINST ENTROCOCCUS FAECALIS A ROOT CANAL DISEASE-CAUSING BACTERIA.....	6-10
Larisa Melia, Revaz Sulukhia, Lali Pkhaladze, Nino Davidova, Archil Khomasuridze. MIFEPRISTON IN OBSTETRICS – WHY NOT?.....	11-14
Maryna Stoliarchuk. CORRELATION BETWEEN TRANSVERSE CEPHALOMETRIC PARAMETERS AND THE SEVERITY OF SKELETAL MALOCCLUSIONS.....	15-18
Deepak, Prashant Rao, Archana, Sowmya M, Sandeep. S, Suma S. A CROSS-SECTIONAL STUDY ON COVID-19 VACCINATION HESITATION AMONG UNIVERSITY STUDENTS.....	19-23
Tchernev G, Broshtilova V, Ivanov L, Alexandrov A, Smilov N, Kordeva S. DRUG RELATED NITROSOGENESIS, PHOTOCARCINOGENESIS AND ONCOPHARMACOGENESIS OF NODULAR MELANOMA: A CASE RELATED ANALYSIS CONCERNING THE POLYCONTAMINATION OF THE POLYMEDICATION WITH VALSARTAN/ HYDROCHLOROTHIAZIDE AND BISOPROLOL.....	24-27
Rawaa J. Matloob, Zeina A. Althanoon, Saad A. Algburi, Mudheher I. Salih, Marwan M. Merkhan. UPDATE ON THE USE OF METHOTREXATE IN THE MANAGEMENT OF RHEUMATOID ARTHRITIS.....	28-33
Georgi Tchernev. (N-NITROSO) PROPAPFENONE INDUCED ADVANCED NODULAR MELANOMA-FIRST REPORTED CASE IN THE WORLD LITERATURE: THE INEXTRICABLE LINKS BETWEEN THE PHOTOCARCINOGENESIS, DRUG RELATED NITROSOGENESIS AND PHARMACO-ONCOGENESIS.....	34-37
Elham M. Mahmood, Entedhar R. Sarhat, Maryam T. Tawfeq, Siham A. Wadee. HISTOLOGICAL AND BIOCHEMICAL STUDY OF THE EFFECT OF FEXOFENADINE ON SALIVARY GLAND IN RATS.....	38-40
Valerii Vovk, Igor Duda, Alla Vovk. THE EFFECT OF A MULTIMODAL APPROACH ON THE RESULTS OF TREATMENT IN SURGERY: INTEGRATION OF CHEMOTHERAPY, SURGERY, AND RADIOTHERAPY.....	41-46
Haitham Alhussain, Deepak, Bharath Chandra V, Lakshmi. R, Sumana A, Jishamol KR. EXAMINATION OF THE INCIDENCE OF POOR SLEEP QUALITY AND FACTORS ASSOCIATED FOR POOR SLEEP DURING THE VARIOUS PHASES OF PREGNANCIES.....	47-53
N. Ksajikyan, H. Aghababyan, M. Sargsyan. ASSESSMENT OF REACTIVITY TO THE BODY UNDER CONDITIONS OF PHYSICAL ACTIVITY IN STUDENTS AGED 17-20 YEARS....	54-58
Abinaya Srinivasa Rangan, Dhanush Balaji.S, Utham Chand, Raghunathan E.G, Deepthi.N, Prasanna Karthik.S. TRIGLYCERIDE – GLUCOSE INDEX, REMNANT CHOLESTEROL AND COMMON CAROTID ARTERY INTIMA-MEDIA THICKNESS AS AN ATHEROSCLEROTIC MARKER IN ISCHEMIC STROKE PATIENTS.....	59-65
Riyam AH. Al-Barwani, Entedar R. sarhat. BREAST CANCER-MODULATED OMENTIN AND VASPIN PLASMA LEVELS.....	66-69
Tchernev G, Dimova D. PERIOULAR HIGH RISK BCCS AFTER ADDITIONAL/PARALLEL INTAKE OF TORASEMIDE, MOXONIDINE AND MIRABEGRON: IMPORTANT LINKS TO SKIN CANCER RELATED (PHOTO-) NITROSOGENESIS IN THE CONTEXT OF PHARMACO-ONCOGENESIS.....	70-76
Abinaya Srinivasa Rangan, Dhanush Balaji.S, Saranya.C, Raghunathan E.G, Deepthi.N, Prasanna Karthik.S. ASSOCIATION OF MPV AND RDW WITH DISEASE ACTIVITY IN PATIENT WITH RHEUMATOID ARTHRITIS.....	77-81
Julieta Nino Gulua, Lela Sturua, Maia Khubua, Lela Shengelia. THYROID CANCER AS A PUBLIC HEALTH CHALLENGE IN GEORGIA.....	82-86
Rahma S. Almallah, Hani M. Almkhtar. MIRABEGRON INDUCED RELAXATION OF ISOLATED BOVINE CORONARY SEGMENTS: ROLE OF NO AND K+ CHANNEL.....	87-92
Gogotishvili Mariam, Gogebashvili Nino, Bakradze Mzia, Gorgiladze Tinatin, Japaridze Fridon. MANIFESTATIONS OF DISEASES OF THE ORAL MUCOSA OF PATIENTS IN THE ADJARA REGION DURING THE COVID-19 PANDEMIC.....	93-95
Nithesh Babu R, Fathima S Nilofar, Saranya Palanisamy, Gnanadeepan T, Mahendra Kumar K. EXPLORING THE INCIDENCE AND PREVALENCE OF NEW-ONSET AUTOIMMUNE DISEASE FOLLOWING COVID-19 PANDEMIC: A SYSTEMATIC REVIEW.....	96-103

E. Mosidze, A. Chikovani, M. Giorgobiani. ADVANCES IN MINIMALLY INVASIVE SURGERY FOR PECTUS EXCAVATUM: ENHANCING OUTCOMES AND PATIENT CARE.....	104-107
Nithesh Babu R, Fathima S Nilofar, Saranya Palanisamy, Gnanadeepan T, Mahendra Kumar K. SIGNIFICANCE OF NEUTROPHIL-LYMPHOCYTE RATIO AND PLATELET-LYMPHOCYTE RATIO AS PROGNOSTIC MARKERS OF DISEASE SEVERITY IN SYSTEMIC LUPUS ERYTHEMATOSUS.....	108-112
Athraa E. Ahmed, Nibras H. Hameed. PREVALENCE OF FETAL CONGENITAL ANOMALIES IN PATIENTS ATTENDING TIKRIT TEACHING HOSPITAL.....	113-116
Kazantsev A.D, Kazantceva E.P, Sarkisyan I.P, Avakova A.E, Shumakova A.O, Dyachenko Y.E, Mezhenko D.V, Kustov Y.O, Makarov Daniil Andreevich, Guliev M.T, Babaeva M.M. COMPARATIVE ANALYSIS OF POSITIVE AND NEGATIVE EXPECTATIONS WITH CONTROL OF VOLITIONAL EFFORT IN YOUNG AND OLD AGES AS RISK FACTORS OF SOCIAL AGING.....	117-121
Arnab Sain, Sarah Arif, Hoosai Manyar, Nauman Manzoor, Kanishka Wattage, Michele Halasa, Arsany Metry, Jack Song Chia, Emily Prendergast, Ahmed Elkilany, Odiamehi Aisabokhale, Fahad Hussain, Zain Sohail. CURRENT CONCEPTS IN THE MANAGEMENT OF BOXER'S FRACTURE.....	122-124
Gonashvili Meri, Kilasonia Besarion, Chikhladze Ramaz, Merabishvili Gela, Beriashvili Rusudan. MEDICO-LEGAL APPLICATIONS OF FRACTURE HEMATOMA: REVIEW.....	125-130
Zynab J. Jarjees, Entedhar R. Sarhat. ASSESSMENT OF OSTEOPONTIN, SCLEROSTIN, AND OSTEOCALCIN LEVELS IN PATIENTS WITH HYPOTHYROIDISM ON MEDICAL THERAPY.....	131-135
Tchernev G, Dimova D. EDUCATION FROM DERMATOLOGISTS: THE SIMULTANEOUSLY DEVELOPMENT OF 16 KERATINOCYTIC CANCERS AFTER USE OF METFORMIN IN COMBINATION WITH LOSARTAN/ HYDROCHLOROTHIAZIDE, METOPROLOL AND NIFEDIPINE-IMPORTANT LINKS TO DRUG RELATED (PHOTO)-NITROSO-CARCINOGENESIS AND ONCOPHARMACOGENESIS.....	136-141
Ismayilov M.U, Polukhov R.Sh, Poddubny I.V, Magammedov V.A. COMPARATIVE ASSESSMENT OF SURGICAL TREATMENT OF COMPLICATIONS OF ULCERATIVE COLITIS IN CHILDREN.....	142-148
Arnab Sain, Arsany Metry, Nauman Manzoor, Kanishka Wattage, Ahmed Elkilany, Michele Halasa, Jack Song Chia, Sarah Arif, Fahad Hussain, Odiamehi Aisabokhale, Zain Sohail. THE ROLE OF DISTAL LOCKING IN INTRAMEDULLARY NAILS FOR HIP FRACTURE FIXATION: A REVIEW OF CURRENT LITERATURE.....	149-150
Buba Chachkhiani, Manana Kalandadze, Shalva Parulava, Vladimer Margvelashvili. EFFECT OF SURFACE ABRASION AND TEMPERATURE TREATMENT ON METASTABLE TETRAGONAL ZIRCONIUM DIOXIDE (EXPERIMENTAL STUDY).....	151-155
Abdulrahman A Abdulhamed, Luma W Khaleel. CARDIOPROTECTIVE EFFECT OF GLYCYRRHIZA GLABRA EXTRACT AND GLYCYRRHIZA GLABRA SILVER NANOPARTICLE AGAINST ALLOXAN AND NICOTINAMIDE INDUCED DIABETIC CARDIAC INJURY IN RATS.....	156-159
Larysa Pentiuk, Tetiana Niushko, Emiliia Osiadla. FEATURES OF BLOOD PRESSURE DAILY MONITORING INDICATORS, STRUCTURAL AND FUNCTIONAL CHANGES OF THE LEFT VENTRICLE AND VESSELS IN WOMEN WITH HYPERTENSION II STAGE OF DIFFERENT REPRODUCTIVE AGE AND THEIR RELATIONSHIP WITH SEX HORMONES LEVEL.....	160-167
Rana dawood Salman Al-kamil, Thamir F. Alkhiat, H. N. K. AL-Saman, H. H. Hussein, Dawood Chalooob Hilyail, Falah Hassan Shari. THE EFFECT OF NUTRITIONAL GENOMICS ON CARDIOVASCULAR SYSTEM.....	168-176
Sopiko Kvaratsthelia. PREVALENCE OF DENTITION, DENTAL ARCHES AND DENTAL ANOMALIES.....	177-180
Dorosh D, Liadova T, Popov M, Volobuieva O, Pavlikova K, Tsivenko O, Chernuskiy V, Hrek I, Kushnir V, Volobuiev D. THE EFFECT OF MELATONIN ON THE SERUM LEVEL OF INTERLEUKIN 31 IN HERPESVIRUS SKIN DISEASES ON THE BACKGROUND OF HIV.....	181-184

HISTOLOGICAL AND BIOCHEMICAL STUDY OF THE EFFECT OF FEXOFENADINE ON SALIVARY GLAND IN RATS

Elham M. Mahmood¹, Entedhar R. Sarhat^{1*}, Maryam T. Tawfeq¹, Siham A. Wadee²

¹College of Medicine, Tikrit University, Tikrit, Iraq

²College of Veterinary Medicine, Tikrit University, Tikrit, Iraq

*Corresponding author: entedharr@tu.edu.iq

Abstract.

Aim: Fexofenadine is a newly introduced oral non-sedating agent used for allergic diseases. We sought to investigate the effects of the use of fexofenadine on the salivary gland of adult male albino rats.

Materials and Methods: 30 adult male albino rats were classified randomly into 3 groups, as follows: Group A (control group) which consisted of 10 healthy rats. Group B (treated group) which consisted of 10 rats received FEX 5mg/kg/day, and Group C (treated group) which consisted of 10 rats received FEX 10mg/kg/day. Blood samples were obtained to assess serum levels of Thioredoxin reductase (TRX) and malondialdehyde (MDA). Salivary glands were removed and prepared for histological examination.

Results: This study showed that significantly ($p < 0.05$) higher TRX and MDA levels were observed in group B and group C, compared to group A. The histological examination for salivary tissues revealed degenerative changes in serous cells of acini were present with deep pyknotic nuclei. Vacuolar cytoplasmic degeneration is also seen in other certain cells. Blood congestion was present in the intralobular blood vessels, particularly around the striated ducts. The glandular secretion duct contained mucus and serous secretion and the wall of the duct was surrounded by many WBCs with macrophage.

Conclusion: Fexofenadine hydrochloride use induces remarkable histopathological changes with dose-dependent response and remarkably linked to elevation of oxidative stress markers.

Key words. Fexofenadine, Malondialdehyde, Thioredoxin reductase.

Introduction.

The salivary glands are located in the mouth and secrete saliva which is an important vehicle for maintaining mouth health and help in food digestion [1]. Minor salivary glands cover the whole oral cavity, while major salivary glands the parotid glands (produce 20-50% of saliva and in total 80% of oral amylase), the submandibular glands, and the sublingual glands [2].

Fexofenadine is a safe antihistamine of a new generation (non-sedating) used to relieve allergic symptoms of seasonal allergies and skin allergies [3]. Fexofenadine is preferred over sedating antihistamines due to their selectivity to H1-receptor antagonism preferably over cholinergic or α -adrenergic thereby exhibiting naïve adverse effects compared to sedating or first-generation antihistamines [4]. Fexofenadine also suppresses eosinophil providing anti-allergic and anti-inflammatory activity [5].

Thioredoxin reductase (TrxR) is part of all cells of all organisms ubiquitously present as a part of thioredoxin system (TrxS) tackling the reduction of thioredoxin (Trx) catalyzed by coenzyme Nicotinamide adenine dinucleotide phosphate (NADPH) [6]. Trx are of 3 subtypes in human cells: cytoplasmic

(Trx1), mitochondrial (Trx2), and spermatozoa (Trx3) [7]. These Trx altogether provide a template for the inhibition of lipid peroxidation and nucleic acid damage. This study was undertaken to investigate the biochemical (Trx, and MDA) and histopathological changes in the salivary gland of adult male albino rats exposed to fexofenadine (FEX) [8].

Materials and Methods.

Experimental animals: A package of 30 white albino rats (Male, aged 8-10 weeks, weight 250-280g) kindly provided by Experimental Animal Center/College of Veterinary Medicine/University of Tikrit. The animals were settled under normal conditions of animal hosting (12-hour dark-light cycle, temperature $23 \pm 1^\circ\text{C}$, humidity 50%, open access to food and water- ad libitum). The study was covered by an ethical agreement of the Ethics Committee of the University of Tikrit College of Veterinary Medicine for the care and use of laboratory animals [9-12].

These animals were divided into three groups (10 rats each), group A (control group) administered vehicle, group B given FEX 5mg/kg/day, and group C given FEX 10mg/kg/day for 2 months (Figure 1). Then blood is collected from the heart puncture and serum is separated and stored.

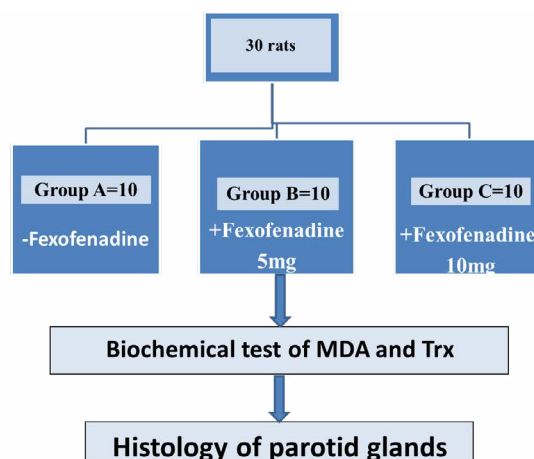


Figure 1. Workflow chart of the study design.

Parotid glands were dissected and fixed in 10% formalin diluted in phosphate-buffered saline. Tissues the next day were sectioned (5- μm thickness) and were made from paraffin wax tissue blocks. These tissue blocks were cut via microtome and sections mounted on slides, dewaxed, stained with hematoxylin and eosin and examined under light microscope [13-16].

Results.

Biochemical parameters: The plasma concentration of MDA and Trx in FEX groups was significantly ($p < 0.05$) higher than the control group (Figure 2).

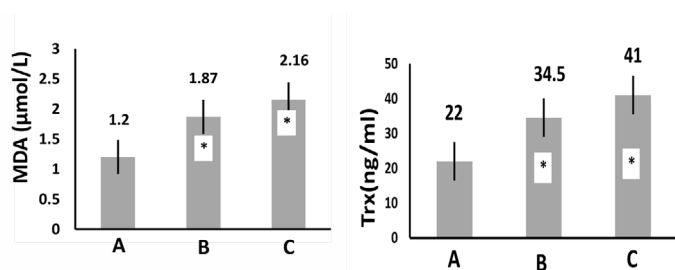


Figure 2. Fexofenadine elevated MDA and Trx as compared to the control group. Data expressed as standard error. * $p < 0.05$. MDA= Malondialdehyde, Trx=Thioredoxin, A=control group, B=fexofenadine 5mg/kg/day, C=fexofenadine 10mg/kg/day.

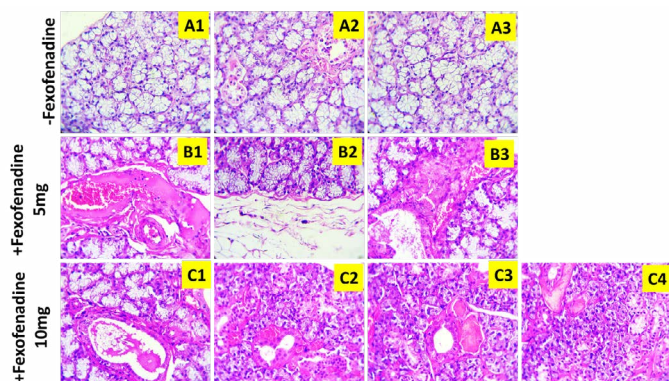


Figure 3. Fexofenadine induced histopathological changes in the parotid gland as compared to the control group. A=control group, B=fexofenadine 5mg/kg/day, C=fexofenadine 10mg/kg/day.

Histological structures of the parotid gland (Figure 3): in the control group, the parenchyma of the gland was around with glandular acini, each cell of light cytoplasm and flattened nuclei (A1). The delicate connective tissue in the acini contained small blood capillaries and lymphocytes (A2). The cytoplasm had great droplets of mucus. There were muco-serous acini which had cells secreting serous media adhered to the mucus acini (Serous demilune) (A3). Fexofenadine 5mg group: The interlobar blood vessel (vein) was highly engorged with haemolyzed blood and blood thrombus, also few WBCs were inside the blood and the blood vessel arteriole had a small mass of blood. The inflammatory white blood cells were infiltrated around the blood vessels (B1). The delicate connective tissue around the gland which is formed by a few collagen and elastic fibres, is associated with the presence of macrophages and few WBCs(B2). The acinar mucus cells were completely degenerated, and the lumen of acini was evacuated from the mucus. The interlobar septa contained collagen bundles in great amounts with fibroblasts and the interlobar blood vessels were filled with blood. The main secretory duct was filled with glandular secretion of mucus and enzymes (B3). Fexofenadine 10mg group: The glandular secretion duct contained mucus and serous secretion and the wall of the duct was surrounded by many WBCs with macrophage (C1). The gland was devoid of the capsule. Degenerated serous cells of acini were present with deep pyknotic nuclei. Vacuolar cytoplasmic degeneration is also seen in other certain cells. Blood congestion was present

in the intralobular blood vessels, particularly around the striated ducts (C2). Blood hemolysis was present in the lumen of veins and arteries, surrounded by infiltration of WBCs. Degenerative changes of many acinar cells are demonstrated. The intercalated and striated secretory ducts were seen as normal (C3). The blood vessels which were present in the different glandular lobules had blood hemolysis and congestion. The acinar serous cells contained cytoplasmic degeneration. White blood cells were infiltrated around the blood vessels and secretory ducts (C4).

Discussion.

Submandibular glands (SMGs) of rats have a mixed structure consisting of both serous and mucous secretory units and are the largest salivary glands of rats. Therefore, SMGs of the rats are a convenient model for investigating morphological integrity [1,2]. One of the most important cellular cytoplasmic redox systems is the thioredoxine system encompassing TRX-1, TRXR1 and NADPH9. It has a high expression in many cancer cells, including breast tumours.

TRX is a multifunctional protein and has anti-inflammatory and antiapoptotic effects, as well as antioxidative effects [6,7]. It can act as a direct scavenger of reactive oxygen species (ROS), and its reduced form inhibits apoptosis by binding to apoptosis signal-regulating kinase-1 (ASK-1). Treatment rats with Fexofenadine induced a significant increase in TRX because of oxidative stress and the production of intramitochondrial ROS, which produces dysregulation of redox status [14-16].

These studies venerate the idea that FEX can indulge salivary glands by transmuting the MDA allied to the biochemical mechanisms accountable for the upholding of cells. All these parameters could be biomarkers of injuriousness in salivary glands. The histopathological study of salivary gland tissues corroborated the biochemical findings. FEX produced many degenerative amendments in tissue including blood hemolysis was present in the lumen of veins and arteries, surrounded by infiltration of WBCs. Degenerative changes of many acinar cells are demonstrated. The intercalated and striated secretory ducts were seen as normal. The key mechanism of histopathological shifts fingered in free radical elaboration, which causes lipid peroxidation and antioxidant enzyme diminution [17].

The contemporary verdicts are also reciprocal to earlier researches of Prestifilippo et al. [18]. Medina et al. in patients with periodontitis trials, have been fretful with the coupled anatomical amendments in the submandibular gland [19]. They have recorded many vagaries, such as secretory granules vanished and fluid accumulation of periductal areas with a noticeably more vacuolization of acinar cells cytoplasm [20,21]. This finding could be helpful to consider fexofenadine for treatment of other rare diseases including Mounier-Kuhn Syndrome [22].

Conclusion.

Fexofenadine elevated thioredoxin reductase and malodialdehyde and induced inflammatory and degenerative histological changes.

REFERENCES

1. Silvers AR, Som PM. Salivary glands. Radiologic clinics of North America. 1998;36:941-66.

2. Proctor GB. The physiology of salivary secretion. *Periodontology* 2000. 2016;70:11-25.
3. Devillier P, Roche N, Faisy C. Clinical pharmacokinetics and pharmacodynamics of desloratadine, fexofenadine and levocetirizine: a comparative review. *Clinical pharmacokinetics*. 2008;47:217-30.
4. Compalati E, Baena-Cagnani R, Penagos M, et al. A systematic review on the efficacy of fexofenadine in seasonal allergic rhinitis: a meta-analysis of randomized, double-blind, placebo-controlled clinical trials. *International archives of allergy and immunology*. 2011;156:1-5.
5. Abdelaziz MM, Devalia JL, Khair OA, et al. Effect of fexofenadine on eosinophil-induced changes in epithelial permeability and cytokine release from nasal epithelial cells of patients with seasonal allergic rhinitis. *Journal of allergy and clinical immunology*. 1998;101:410-20.
6. Mustacich D, Powis G. Thioredoxin reductase. *Biochemical Journal*. 2000;346:1-8.
7. Biaglow JE, Miller RA. The thioredoxin reductase/thioredoxin system: novel redox targets for cancer therapy. *Cancer biology & therapy*. 2005;4:13-20.
8. Smart DK, Ortiz KL, Mattson D, et al. Thioredoxin reductase as a potential molecular target for anticancer agents that induce oxidative stress. *Cancer research*. 2004;64:6716-24.
9. Younis MA, Hamid OA, Dhaher R, et al. Characterization of the renal safety profiles of coumacines. *Pharmakefteki Journal*. 2023;35:57-63.
10. Althanoon ZA, Merkhan MM. CoQ10 dampens the deleterious impact of doxorubicin- induced liver and spleen injury in white Albino rats *Current topics in pharmacology*. 2023;27:31-40.
11. Al-Shakarchi W, Saber Y, Merkhan M, et al. Acute toxicity of coumacines: an in vivo study. *Georgian Medical News*. 2023;338:126-31.
12. Abdullah SI, Al-Bayti AA, Salih MJ, et al. Histological and Biochemical Changes Associated with Blocking of Serotonin Receptor. *Tropical Journal of Natural Product Research*. 2022;6.
13. Abdulqader SW, Faisal IM, Saeed MG, et al. Fluvoxamine provide a gastro-protection against vitiated insult. *Indian Journal of Forensic Medicine & Toxicology*. 2022;16:1046-52.
14. Abdulqader SW, Faisal IM, Saeed MG, et al. Fluvoxamine suppressed oxidative stress associated with tissue erosion. *Research Journal of Pharmacy and Technology*. 2022;15:819-24.
15. Soroka Y, Kramar S, Smahlii Z, et al. Nanoparticles and colorectal cancer: can the use of metal nanoparticle compositions affect oxidative stress markers and colon histological changes under dmh-induced carcinogenesis. *Georgian Medical News*. 2023;342:11-20.
16. Nurullita U, Susilaningsih N, Suwondo A, et al. Supplementation of *Caesalpinia Sappan* L. Extract to Increase Superoxide Dismutase Activity and Suppress Malondialdehyde Levels in Sprague Dawley Exposed to Inhaled Formaldehyde. *Pharmacognosy Journal*. 2023;15.
17. Prestifilippo JP, Carabajal E, Croci M, et al. Histamine modulates salivary secretion and diminishes the progression of periodontal disease in rat experimental periodontitis. *Inflammation Research*. 2012;61:455-64.
18. Medina VA, Prestifilippo JP, Croci M, et al. Histamine prevents functional and morphological alterations of submandibular glands induced by ionising radiation. *International journal of radiation biology*. 2011;87:284-92.
19. Sarhat ER, Wadi SA, Ahmed MS, et al. Evaluation of Serum Malondialdehyde, Glutathione peroxidase, Superoxide dismutase, and Catalase levels in Hormonal Contraceptives in Tikrit City. *Tikrit Medical Journal*. 2018;24:10-20.
20. Sarhat ER, Wadi SA, Mahmood AR. Effect of ethanolic extraction of *moringa oleifera* on paraoxonase and arylesterase enzyme activity in high fat diet-induced obesity in rats. *Research Journal of Pharmacy and Technology*. 2018;11:4601-4.
21. Sarhat ER. Effect of Ginger on the activity of some antioxidant enzymes (Superoxide dismutase, and Catalase) of Alloxan Experimental Induced-Diabetic Rabbits. *Al-Mustansiriyah J. Sci*. 2011;5:192-200.
22. Aldoseri AS. Mounier-Kuhn Syndrome: Case of Cough, Recurrent Chest Infections with Bronchiectasis. *Bahrain Medical Bulletin*. 2023;45.