**DOI 10.26724/2079-8334-2022-2-80-218-222**
**UDC 615.212.3:615.036.8:617.583:616.441-007.21**

**D.S. Nosivets, T.M. Shevchenko, O.Yu. Govorukha**
**Oles Honchar Dnipro National University, Dnipro**

# INFLUENCE OF NON-STEROIDAL ANTI-INFLAMMATORY DRUGS ON MOVEMENT-RESEARCH BEHAVIOR OF ANIMALS UNDER EXPERIMENTAL SECONDARY OSTEOARTHRITIS

e-mail: dsnosivets@ukr.net

The study was performed on 160 white nonlinear rats, which reproduced experimental osteoarthritis by intra-articular injection of 0.1 ml monoiodoacetic acid solution and reproduced experimental hypothyroidism by enteral administration of 0.02 % carbimazole solution. Changes in motor-research behavior of animals are studied in the test "open field". The detected changes on the 42nd day of the experiment in all groups of animals indicate the suppression of motor and research activity against the background of increasing pathological changes under the influence of experimental models. Decreased motor activity indicates the development of pain in the knee joints of animals, which limits their movement. It was found that the appointment of L-thyroxine at a dose of 1.5 μg/kg highlights the trend of recovery of spontaneous behavioral activity, and the use of paracetamol at a dose of 150 mg/kg and L-thyroxine contributes to greater inhibition of motor and research activity of rats.

**Key words:** non-steroidal anti-inflammatory drugs, "open field" test, spontaneous behavioral activity, experimental osteoarthritis, experimental hypothyroidism.

**Д.С. Носівець, Т.М. Шевченко, О.Ю. Говоруха**

# ВПЛИВ НЕНАРКОТИЧНИХ АНАЛЬГЕТИКІВ НА РУХОВО-ДОСЛІДНИЦЬКУ ПОВЕДІНКУ ТВАРИН ЗА УМОВ ЕКСПЕРИМЕНТАЛЬНОГО ВТОРИННОГО ОСТЕОАРТРОЗУ

Дослідження проведенні на 160 білих нелінійних щурах, яким шляхом внутрішньосуглобового введення 0,1 мл розчину монойодоцтової кислоти відтворений експериментальний остеоартроз та шляхом ентерального введення 0,02 % розчину карбімазолу відтворений експериментальний гіпотиреоз. Зміни рухово-дослідницької поведінки тварин вивчені в тесті «відкрите поле». Виявлені зміни на 42 добу експерименту у всіх групах тварин свідчать про пригнічення рухової та дослідницької активності на фоні наростання патологічних змін під впливом експериментальних моделей. Зменшення рухової активності свідчить про розвиток болю у колінних суглобах тварин, що обмежує їх пересування. Встановлено, що призначення L-тироксину у дозі 1,5 мкг/кг висвітлює тенденцію відновлення показників спонтанної поведінкової активності, а використання парацетамолу у дозі 150 мг/кг та L-тироксину сприяє більшому пригніченню рухової та дослідницької активності щурів.

**Ключові слова:** ненаркотичні анальгетики, відкрите поле, спонтанна поведінкова активність, експериментальний остеоартроз, експериментальний гіпотиреоз.

*The study is a part of the research project* "*Monitoring the health of the population of Dnipropetrovsk region with the analysis of clinical and laboratory indicators*", *state registration No. 0119U101044.*

Diseases of the thyroid gland are an urgent problem in modern society in connection with the widespread of this pathology. The negative impact of hormonal thyroid dysfunction on the functional state of organs and systems is due to the main role of thyroid hormones in metabolic processes [1, 10, 15].

In modern clinical practice, conditions with decompensated forms of hypothyroidism are quite common, which leads to changes in the joints, limits the ability of patients to self-care, and reduces their quality of life [5, 14]. In these cases, there is a need for non-steroidal anti-inflammatory drugs (NSAIDs), which are known for their side effects and cannot be prescribed for a long time. Also in the modern literature, the question of rational use and influence of NSAIDs on the processes of joint metabolism in hypothyroidism is not revealed [9, 11, 12].

It is known that hypothyroidism leads to changes in spontaneous behavioral activity and reduced cognitive abilities of patients, and metabolic disorders adversely affect the condition of bone and cartilage, causing the development of a number of pathological conditions, including secondary osteoarthritis (OA) [3, 6, 7]. However, the consequences of the interaction of NSAIDs with the basic pharmacotherapy of hypothyroidism, and the effectiveness, and features of the action of certain drugs are unknown [13].

**The purpose** of the study was to investigate the effect of non-steroidal anti-inflammatory drugs (NSAIDs) on the motor-research behavior of rats in the "open field" test under conditions of secondary osteoarthritis on the background of hypothyroidism.

**Materials and methods.** The study was performed on 160 white nonlinear rats of both sexes, weighing 250–280 g, which were kept in standard conditions of the vivarium of Oles Honchar Dnipro National University. All manipulations were carried out in accordance with the principles of bioethics in accordance with the provisions of the European Convention for the Protection of Vertebrate Animals Used

for Experimental and Other Scientific Purposes (European Convention for the Protection of Vertebrate Animals used for Experimental and Other Scientific Purposes, Strasbourg, 1986). "On the protection of animals against cruel treatment" (No. 1759-VI of 15.12.2009) and the European Union Directive 2010/10/63 EU on animal experiments, confirmed by the Commission on Bioethics of Oles Honchar Dnipro National University (protocol No. 5 dated 02.09.2021).

Experimental OA was reproduced by a single intra-articular injection of 0.1 ml of monoiodoacetic acid solution (reagent Iodoacetic acid ≥98.0 % T, № I4386, manufacturer Sigma-Aldrich Chemie GmbH, Germany) in the knee joint at a rate of 3 mg per 50 μl of sterile saline [2, 8]. Experimental hypothyroidism (HT) was reproduced by enteral administration of 0.02 % carbimazole solution (Espa-Carb tablets, manufactured by Lindopharm GmbH, Germany) (5 mg per 250 ml of saline) with a drinking diet for 6 weeks [4].

After the formation of experimental models of OA and HT on the 42nd day of the experiment, the animals were selectively divided into 8 experimental groups of 20 rats in each group (n=20): Group I – control (OA+HT); Group II, which received L-thyroxine (manufacturer "Berlin-Scheme", Germany) (T) at a dose of 1.5 μg/kg (intragastrically); Group III – ibuprofen (manufacturer PJSC Research Center "Borschagovsky Chemical-Pharmaceutical Plant", Ukraine) (I) at a dose of 5 mg/kg (intragastrically); Group IV – T+I in appropriate doses and route of administration; Group V – meloxicam (manufacturer PJSC "Lekhim-Kharkiv", Ukraine) (Mel) at a dose of 10 mg/kg (intragastrically); Group VI – T+Mel in appropriate doses and routes of administration; Group VII – paracetamol (manufacturer CJSC "Pharmaceutical firm Darnitsa", Ukraine) (P) at a dose of 150 mg/kg (intragastrically); Group VIII – T+P in appropriate doses and route of administration. Tween-80 solution (Polysorbate 80, Ukraine) was used to obtain a homogeneous suspension by intragastric administration of tablet forms.

To assess the psycho-emotional status of experimental rats, the "open field" test was used, which determines the physiological response to the new environment and evaluates the motor, research, and emotional activity of animals [3, 4]. The study was performed for 5 minutes by recording the number of movements, lifts, and sightings of minks. Motor activity and orientation research activities were determined using a 100×100 cm site with white vertical walls 40 cm high, divided into 16 squares and 9 holes 5 cm in diameter. The rat was placed in the center of the field and observed for 5 min. During this time, the number of crossed horizontal squares (horizontal motor activity), the number of examined holes (approximate research activity), and the size of the racks on the hind legs (vertical motor activity) were counted. Evaluation of changes in the "open field" test was performed at initial state (IS), on day 42, and on day 47 of the experiment.

Laboratory animals were removed from the experiment by an overdose of sodium thiopental.

Statistical processing of the results of the research was performed using the software package STATISTICA 6.1 (StatSoftInc., Serial number AGAR 909E415822FA). Descriptive statistics for each indicator included calculations of the arithmetic mean (M), standard deviation (SD), and standard error of the mean (m). Before applying the statistical criteria, the hypothesis of the normal law of distribution of random variables was tested (according to the Shapiro-Wilk test). Under normal conditions, the reliability of intergroup and intragroup differences was assessed using Student's parametric criteria (t, T), in other cases – by non-parametric Mann-Whitney (U) and Wilcoxon (W) criteria. Dunnett's (in the case of comparison with the control group) and Duncan's (intergroup comparison) criteria were used for multiple comparative analyses. The critical level of statistical significance (p) was taken as ≤5 % ($p<0.05$). All units of measurement and parameters used in the study are given in accordance with the International System of Units.

**Results of the study and their discussion.** The terms of the study are determined in relation to the peculiarities of the experimental work. Thus, 42 days of the experiment determine the deadline for the formation of experimental models of OA and HT, and 47 days corresponds to the deadline for the 5-day administration of drugs studied from 42 days. Assessment of changes in the "open field" test was performed at initial state (IS), on day 42 (deadline for the formation of experimental models), and on day 47 (deadline for drug administration) of the experiment.

In the analysis of the obtained results, it was found that on the 42nd day of the experiment in all groups there was the suppression of motor-research behavior of rats in comparison with IS ($p<0.05$) (Table 1).

Thus, in group I the number of crossed squares significantly decreased by 82.4 % compared to the IS, in group II – by 61.2 %, in group III – by 59.5 %, in group IV – by 70.2 %, in group V – by 71.2 %, in group VI – by 75.4 %, in group VII – by 64.8 %, in group VIII – by 43.7 %. At the same time, in all groups, the average number of crossed squares was significantly higher ($p<0.05$) than in the active control group (group I – OA+HT).

According to the number of visits to the holes on the 42nd day of the experiment, the average values decreased significantly ($p<0.05$) (compared to the IS) in group I – by 70.2 %, in group II – by 80.6 %, in group III – by 55.4 %, in group IV – by 66.2 %, in group V – by 72.1 %, in group VI – by 60.0 %, in group VII – by 81.9 %, in group VIII – by 58.3 %.

Table 1

**Indicators of motor-research behavior of rats in the background of the administration of analgesics**

| Drugs and dose | Evaluation criteria in the "open field" test | The term of the study | | |
|---|---|---|---|---|
| | | Initial state (IS) | on day 42 | on day 47 |
| group I OA+HT (n=20) | squares | 25.63±4.07 | 4.5±1.60* | 12.13±2.85* |
| | holes | 8.38±1.85 | 2.5±0.53* | 2.25±1.49* |
| | racks | 6.50±1.93 | 1.13±1.13* | 1.75±1.04* |
| group II, L-thyroxine (T) 1.5 μg/kg (n=20) | squares | 27.8±6.11 | 10.8±2.49* | 13.1±2.36* |
| | holes | 10.3±1.28 | 2.0±1.07* | 5.13±2.17* |
| | racks | 9.25±2.87 | 1.38±0.74* | 4.13±0.83* |
| group III ibuprofen (I) 5 mg/kg (n=20) | squares | 35.3±9.0 | 14.3±5.57* | 25.4±9.07* |
| | holes | 9.25±2.12 | 4.13±2.17* | 8.38±1.69 |
| | racks | 8.25±1.67 | 3.63±2.5* | 5.38±2.0* |
| group IV ibuprofen (I)+L-thyroxine (T) (n=20) | squares | 27.3±6.8 | 8.13±1.13* | 21.8±1.67* |
| | holes | 8.13±1.73 | 2.75±1.28* | 6.88±1.36 |
| | racks | 6.88±1.96 | 2.25±0.89* | 5.63±1.06 |
| group V meloxicam (Mel) 10 mg/kg (n=20) | squares | 33.8±4.89 | 9.75±2.49* | 16.8±3.45* |
| | holes | 6.75±2.31 | 1.88±0.83* | 2.0±1.07* |
| | racks | 9.88±3.04 | 1.25±1.04* | 3.5±1.77* |
| group VI meloxicam (Mel) +L-thyroxine (T) (n=20) | squares | 26.9±5.03 | 6.63±1.92* | 13.9±3.60* |
| | holes | 8.75±2.49 | 3.5±0.93* | 8.5±1.93 |
| | racks | 7.13±2.23 | 2.63±1.06* | 5.0±1.60* |
| group VII paracetamol (P) 150 mg/kg (n=20) | squares | 29.3±7.46 | 10.3±3.2* | 12.4±2.92* |
| | holes | 6.25±2.12 | 1.13±0.64* | 3.38±1.92* |
| | racks | 10.9±3.52 | 1.13±0.83* | 9.38±2.67 |
| group VIII paracetamol (P) +L-thyroxine (T) (n=20) | squares | 29.5±4.5 | 16.6±3.25* | 17.3±2.82* |
| | holes | 7.5±1.2 | 3.13±0.99* | 4.13±1.89* |
| | racks | 7.25±1.67 | 1.88±0.83* | 4.0±1.85* |

Note: * – values are significant (p<0,05) in relation to the initial state (IS)

On the 42nd day of the experiment, the average number of vertical racks significantly (p<0.05) decreased (compared to the IS) in group I – by 82.6 %, in group II – by 85.1 %, in group III – by 56.0 %, in group IV – by 67.3 %, in group V – by 87.3 %, in group VI – by 63.1 %, in group VII – by 89.6 %, in group VIII – by 74.1 %.

When analyzing the results obtained on the 47th day of the experiment, it was found that in group I rats there was a further significant suppression of motor and research activity against the background of increasing pathological changes under the influence of experimental models. In particular, during 47 days the motor activity according to the indicators of crossed squares decreased by 52.7 % (p<0.05), the number of vertical racks decreased by 73.1 % (p<0.05), and according to the number of visits to the holes decreased by 73.2 % (p<0.05).

Under the conditions of L-thyroxine (group II) at a dose of 1.5 μg/kg, the following changes in motor activity were observed: the number of crossed squares on the 42nd day of modeling of experimental models of OA and HT was reduced by 61.2 % (p<0.05), and after 5 days administration of T, this figure was reduced by 52.9 % (p<0.05) relative to the IS. The number of visits to the holes on the 47th day decreased by 50.2 % (p<0.05), and the number of vertical racks on the 47th day – by 55.4 % (p<0.05) relative to the IS.

When prescribing ibuprofen (group III), statistically significant results on the 47th day of the experiment were obtained only by the number of crossed squares and racks, which were reduced by 28.0 % and 34.8 % relative to the IS (p<0.05). Co-administration of ibuprofen and L-thyroxine (group IV) on day 47 of the experiment resulted in a decrease in the number of crossed squares relative to the IS by 20.1 % (p<0.05).

The analysis of 5-day administration of meloxicam (group V) found a significant (p<0.05) decrease in the number of crossed squares, racks, and views of the holes by 50.3 %, 64.6 %, and 70.4 %, respectively, relative to the IS. When prescribing meloxicam in combination with L-thyroxine (group VI) on the 47th day of the experiment, a decrease in motor and research activity of rats by the number of crossed squares and racks by 48.3 % (p<0.05) and 29.9 % (p<0.05), respectively, relative to the IS.

With the administration of paracetamol (group VII), the number of crossed squares and visits to the holes on the 47th day of the study decreased relative to the IS by 57.7 % (p<0.05) and 45.9 % (p<0.05), respectively. With the combined administration of paracetamol and L-thyroxine (group VIII) the number of crossed squares, racks, and holes on the 47th day of the experiment significantly decreased by 41.4 %, 44.8 %, and 44.9 % (p<0.05 ) respectively in relation to the IS.

It is known that in clinical conditions hypothyroidism leads to changes in bone and cartilage [14], due to developing the development of osteoarthritis [15], and affects indices of spontaneous behavioral activity and forms reduction of cognitive abilities [3-6]. The results obtained do not contradict the data of modern professional literature and confirm allegations of motor depression, research and vegetative activity of animals in the background increase in pathological changes under the influence of mental hypothyroidism and osteoarthritis. This can be seen from corresponding indices in rats of group I at 42 and 47 days experiment.

It is known that in clinical conditions HT leads to changes in the structural organization of bone and cartilage, causing the development of degenerative-dystrophic changes [2, 5], affecting the indices of spontaneous behavioral activity and reduces cognitive abilities of patients [6, 7, 10, 14]. The results obtained in the study do not contradict the modern literature and confirm the opinion on the influence of various substances (especially NSAIDs) on motor and research activity of animals against the background of increasing pathological changes under the influence of experimental secondary OA and HT [3, 6, 7].

The detected changes in the "open field" test on the 42nd day of the experiment in all groups of animals indicate the suppression of motor and research activity against the background of increasing pathological changes under the influence of experimental models [6, 7, 14]. Decreased motor activity may also indicate the development of pain in the knee joints of animals, which limits their movement [9, 11, 13].

Thus, the data obtained on the 42nd day of the experiment reflect the suppression of motor-research behavior of rats against the background of increasing pathological changes and confirm the adequacy of the performed experimental models [3, 6, 7].

The results obtained on the 47th day of the experiment show that in group I rats there was a further trend of inhibition of motor and research activity of animals against the background of increasing pathological changes under the influence of experimental models and lack of NSAIDs.

Under the conditions of L-thyroxine (group II) at a dose of 1.5 μg/kg, the results show a tendency to restore indicators of spontaneous behavioral activity (relative to IS), which compared with group I indicate the ability of L-thyroxine to influence the formed pathological models.

Administration of ibuprofen at a dose of 5 mg/kg contributes to more effective restoration of motor and research activity of rats (compared to IS) than the combined administration of ibuprofen and L-thyroxine.

The study found that administration of meloxicam at a dose of 10 mg/kg in combination with L-thyroxine contributes to more effective recovery of spontaneous behavioral activity (relative to IS) than the isolated use of meloxicam.

Analysis of the results obtained in groups VII and VIII found that the appointment of paracetamol at a dosage of 150 mg/kg and L-thyroxine contributes to greater inhibition of motor and research activity in rats.

## Conclusions

1. Secondary osteoarthritis on the background of hypothyroidism is characterized by deterioration of motor research behavior of animals against the background of increasing pathological changes in the functional deficit of the thyroid gland and musculoskeletal system.

2. Basic L-thyroxine replacement pharmacotherapy helps to restore motor and research activity of rats under conditions of osteoarthritis and hypothyroidism.

3. The combination of analgesics and L-thyroxine contributes to changes in motor research behavior of animals with osteoarthritis and hypothyroidism and has different effects on spontaneous behavioral activity.

4. The different efficacy of non-steroidal anti-inflammatory drugs in the combined use of L-thyroxine in conditions of secondary osteoarthritis in the background of hypothyroidism requires further study.

## References

1. Yeroshenko HA, Yachmin AI, Shevchenko KV, Lichman DV, inventors; Sposib vyznachennia vplyvu kharchovykh dobavok na adaptyvni reaktsii shchuriv. Patent Ukrainy na korysnu model UA 144154 U. 2020 September,10. [in Ukrainian]

2. Nosivets DS. Vliyaniye funktsionalnoy nedostatochnosti shchitovidnoy zhelezy na kostno-khryashchevuyu tkan. Morphologia. 2019;13(1):47–51. DOI: https://doi.org/10.26641/1997-9665.2019.1.47-51[in Russian]

3. Nosivets DS. Eksperimentalnyye modeli patologii khryashchevoy tkani. Zaporozhye Medical Journal. 2019; 21(4),554–560. DOI: https://doi.org/10.14739/2310-1210.2019.4.173362 [in Russian]

4. Argumedo GS, Sanz CR, Olguín HJ. Experimental models of developmental hypothyroidism. Horm Metab Res. 2012 Feb;44(2):79–85. doi: 10.1055/s-0031-1297941. Epub 2011 Dec 27. PMID: 22203441.

5. Borzì AM, Biondi A, Basile F, Vacante M. Diagnosis and treatment of hypothyroidism in old people: A new old challenge. Wien Klin Wochenschr. 2020 Mar;132(5-6):161–167. doi: 10.1007/s00508-019-01579-8. Epub 2019 Nov 26. PMID: 31773270.

6. dos Reis-Lunardelli EA, Castro CC, Bavaresco C, Coitinho AS, da Trindade LS, Perrenoud MF, Roesler R, Sarkis JJ, de Souza Wyse AT, Izquierdo I. Effects of thyroid hormones on memory and on Na(+), K(+)-ATPase activity in rat brain. Curr Neurovasc Res. 2007 Aug;4(3):184–93. doi: 10.2174/156720207781387204. PMID: 17691972.

7. Ge JF, Peng L, Hu CM, Wu TN. Impaired learning and memory performance in a subclinical hypothyroidism rat model induced by hemithyroid electrocauterisation. J Neuroendocrinol. 2012 Jun;24(6):953–61. doi: 10.1111/j.1365-2826.2012.02297.x. PMID: 22324892.
8. Guingamp C, Gegout-Pottie P, Philippe L, Terlain B, Netter P, Gillet P. Mono-iodoacetate-induced experimental osteoarthritis: a dose-response study of loss of mobility, morphology, and biochemistry. Arthritis Rheum. 1997 Sep; 40 (9):1670–9. doi: 10.1002/art.1780400917. PMID: 9324022.
9. Kim KH, Seo HJ, Abdi S, Huh B. All about pain pharmacology: what pain physicians should know. Korean J Pain. 2020 Apr 1; 33(2):108–120. doi: 10.3344/kjp.2020.33.2.108. PMID: 32235011; PMCID: PMC7136290.
10. McDermott MT. Hypothyroidism. Ann Intern Med. 2020 Jul 7; 173(1):ITC1-ITC16. doi: 10.7326/AITC202007070. PMID: 32628881.
11. McMahon SB, Dargan P, Lanas A, Wiffen P. The burden of musculoskeletal pain and the role of topical non-steroidal anti-inflammatory drugs (NSAIDs) in its treatment. Ten underpinning statements from a global pain faculty. Curr Med Res Opin. 2021 Feb; 37(2):287–292. doi: 10.1080/03007995.2020.1847718. Epub 2020 Nov 20. PMID: 33155849.
12. Qaseem A, McLean RM, O'Gurek D, Batur P, Lin K, Kansagara DL. Nonpharmacologic and Pharmacologic Management of Acute Pain From Non-Low Back, Musculoskeletal Injuries in Adults: A Clinical Guideline From the American College of Physicians and American Academy of Family Physicians. Ann Intern Med. 2020 Nov 3; 173(9):739–748. doi: 10.7326/M19-3602. Epub 2020 Aug 18. PMID: 32805126.
13. Sharma L. Osteoarthritis of the Knee. N Engl J Med. 2021 Jan 7; 384(1):51–59. doi: 10.1056/NEJMcp1903768. PMID: 33406330.
14. Simon C, Weidman-Evans E, Allen S. Subclinical hypothyroidism: To treat or not to treat? JAAPA. 2020 May; 33(5):21–26. doi: 10.1097/01.JAA.0000660120.03250.55. PMID: 32282411.
15. Williams GR. Thyroid hormone actions in cartilage and bone. Eur Thyroid J. 2013 Mar; 2(1):3–13. doi: 10.1159/000345548. Epub 2012 Dec 19. PMID: 24783033; PMCID: PMC3821494.

Стаття надійшла 15.04.2021 р.

**DOI 10.26724/2079-8334-2022-2-80-222-226**
**UDC 616-001.18/19-092.9+591.4**

**V.I. Pivtorak, B.V. Sydorenko, V.M. Monastyrskyi, K.V. Pivtorak, M.P. Bulko**
**National Pirogov Memorial Medical University, Vinnytsia**

## EFFICACY OF AN EXPERIMENTAL MODEL OF NON-ALCOHOLIC FATTY LIVER DISEASE BASED ON A HIGH-FAT DIET WITH CHOLESTEROL

e-mail: pivtorakv@gmail.com

The purpose of the study was to establish the effectiveness and informativeness of the experimental model of non-alcoholic fatty liver disease based on high-fat diet and cholesterol in the experiment. The studies were performed on 60 white nonlinear adult male rats, weighing 180–200 g at the beginning of the experiment. During the experiment, the use of high-fat diet and cholesterol for 60 days resulted in an increase in body weight, rat body mass index, liver mass and liver mass index, increase in activity of alanine aminotransferase and aspartate aminotransferase, hyperglycemia. Morphological changes of liver tissues were characterized by fatty degeneration of hepatocytes, which had the form of microvesicular and macrovesicular vacuolation with deformation of the nuclei and their displacement to the periphery of the cell, a change in the size of the sinusoids. It is important to bring the experimental model as close as possible to the mechanisms of non-alcoholic fatty liver disease in humans.

**Key words:** liver, obesity, animal model, rats.

**В.І. Півторак, Б.В. Сидоренко, В.М. Монастирський, К.В. Півторак, М.П. Булько**

## ДІЄВІСТЬ ЕКСПЕРИМЕНТАЛЬНОЇ МОДЕЛІ НЕАЛКОГОЛЬНОЇ ЖИРОВОЇ ХВОРОБИ ПЕЧІНКИ НА ОСНОВІ ВИСОКОЖИРОВОЇ ДІЄТИ ТА ХОЛЕСТЕРИНУ

Метою роботи було встановити дієвість та інформативність експериментальної моделі неалкогольної жирової хвороби печінки на основі високожирової дієти та холестерину в експерименті. Дослідження проведені на 60 білих нелінійних статевозрілих щурах-самцях, з масою на початок експерименту 180–200 г. У процесі проведення експерименту використання високожирової дієти та холестерину протягом 60 днів призвело до збільшення маси тіла, індексу маси тіла щурів, маси печінки та індексу маси печінки, підвищенням активності аланінамінотрансферази й аспартатамінотрансферази, гіперглікемії. Морфологічні зміни тканин печінки характеризувалися жировою дистрофією гепатоцитів, яка мала вигляд мікровезикулярної та макровезикулярної вакуолізації з деформацією ядер і зміщенням їх до периферії клітини, зміною розмірів синусоїдів. Важливим є максимальне наближення експериментальної моделі до механізмів виникнення неалкогольної жирової хвороби печінки у людини.

**Ключові слова:** печінка, ожиріння, модель на тваринах, щури.

*This study is a fragment of the research project "Features of compensatory and adaptive processes in various diseases and injuries of humans and animals, clinical and experimental justification of new surgical treatment methods" state registration No.: 0118U007342.*

The study of the mechanisms of steatohepatitis and liver cirrhosis, assessment of hepatotoxicity of various substances, study of hepatoprotectors and the use of modern cellular technologies are impossible without an adequate model of non-alcoholic fatty liver disease in laboratory animals.