6. Dolynko NP. ”Morfofunktsionalnyi stan yayechok v umovakh khronichnoyi alkohol'noyi intoksykatsiyi ta yiyi korektsiyi ekstraktom z lystya Hinkho biloba”. Visnyk problem biolohiyi i medytsyny. 2014; 3(3,112): 263-265. [in Ukrainian]
7. Pastukhova VA. ”Vplyv Hinkho biloba na ultrastrukturu yayechka shchuriv pry diyi ekstremalnoyi hipertermiyi”. Halytskyi likarskyi visnyk. 2010; 17(2,2): 80-82. [in Ukrainian]
8. Stepanets IO. ”Otrymannya i kharakterystyka imunohlobuliniv iz syrovatky krovi shchuriv z khronichnoyu alkoholnoyu intoksykatsiyeyu”. Medychna khimiya. 2013; 15(1): 72-75. [in Ukrainian]
9. Chaykovskyi YuB, Polyvkan MI. ”Zminy hemodynamiky ta spermatohenezu u neoperovanykh cholovikiv v umovakh kosoyi pakhvynnoyi hryzhi”. Svit medytsyny ta biolohiyi. 2017; 1(59): 87-89. [in Ukrainian]
10. Chornokulskyi IS, Chaykovskyi YuB, Boyko MS, Bazalytska SV. ”Morfolohichni osoblyvosti cholovichykh eyakulyovanykh spermatozoyidiv v normi ta pry neplidnosti”. Svit medytsyny ta biolohiyi. 2013; 4(42): 52-53. [in Ukrainian]
11. Chornokulskiy IS. ”Tselostnost geneticheskogo materiala spermatozoidov, kak marker muzhskoy fertil'nosti”. Svit medytsyny ta biolohiyi. 2014; 3(33): 110-120. [in Russian]
12. Henkel R, Hoogendijk CF, Bouic PJ, Kriger TF. ”TUNEL assay and SCSA determine different aspects of sperm DNA damage”. Andrologia. 2010; 42(5): 305-313.
13. Moretti E, Capitani S, Figura N. ”The presence of bacteria species in semen and sperm quality”. J. Assist. Reprod. Genet. 2009; 26(1): 47-56.
14. Schatten H, Sun Q-Y. ”The role of centrosomes in mammalian fertilization and its significance for ICSI”. Mol. Hum. Reprod. 2009; 15(9): 531-538.
15. Schill WB, Comhaire FN, Hargreave TV. ”Andrology for the clinician”. Springer-Verlag Berlin Heiderberg. 2011; 800 p.

Реферати

ХАРАКТЕР ЦИТОЛОГИЧЕСКИХ ИЗМЕНЕНИЙ В КЛЕТКАХ СПЕРМАТОГЕННОГО ЕПИТЕЛИЯ И ЭЯКУЛЯТА В УСЛОВИЯХ ЭТАНОЛОВОЙ ИНТОКСИКАЦИИ

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Гистологическим, елекронномикроскопичним и лабораторным методом исследовано влияние этанола на сперматогенез в условиях эксперимента. Установлено, что в отдаленные сроки исследования этанол вызывает гистоструктурные изменения в извитых семенных канальцах с достоверным уменьшением количества первичных и вторичных сперматоцитов и сперматид. В эякуляте достоверно снижается концентрация сперматозоидов, количество нормальных и живых сперматозоидов, сперматозоидов с прогрессивным движением. Параллельно увеличивается количество мертвых и патологических форм сперматозоидов. По данным электронной микроскопии в этих условиях нарушается ультраструктура элементов собственной оболочки извитых семенных канальцев, поддерживающих эпителиоцитов, их соединительного аппарата, головки и жгутика сперматозоидов.

Ключевые слова: клетки сперматогенного эпителия, этанол
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THE CHARACTERISTICS OF CYTOLOGICAL CHANGES IN CELLS OF SPERMATOGENIC EPITHELIUM AND EJACULATE UNDER CONDITIONS OF ETHANOL INTOXICATION

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The influence of ethanol on spermatogenesis in the experimental conditions was investigated by histological, electron microscopic and laboratory methods. It has revealed that in the long term of the experiment ethanol causes histostructural changes in the convoluted seminiferous tubules with a certain decrease in the number of primary and secondary spermatocytes and spermatides. In ejaculate, the concentration of sperm, the number of normal and live sperm, sperm with progressive movement is likely to decrease. In parallel, the number of dead and pathological forms of spermatozoa increased. According to the electron microscopy data under these conditions, the ultrastructure of the elements of the tunica propria of the convoluted seminiferous tubules, Sertoli cells, their junctions, heads and tails of the sperm were damaged.

Key words: spermatogenic epithelium cells, ethanol.
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STRUCTURAL FEATURES OF THE TONGUE DORSUM MUCOSA IN RATS AFTER THE METHACRYLATE EFFECT

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The present study is devoted to the structural components changes in the rat tongue dorsum mucous membrane after the action of 1% methacrylic acid ether, manifesting itself in the epithelial plate’s differentiation processes disorder in the form of hyperkeratosis. The plate’s thickness is increasing during the observation period due to hyperhydration of the amorphous substance, which is accompanied by the height reduction of the connective tissue papillae. Changes in the hemomicrocirculatory bed’s links are manifested by the resistance and capacity links narrowing on the 14th day of the experiment with a certain restoration of indices on the 30th day. During the observation, the expansion of the capillaries lumen by 20% was determined.

Key words: mucous membrane, tongue dorsum, rat, 1% methacrylic acid ether.

The work is a fragment of the research project "Experimental and morphological study of the cryopreserved placenta transplants and other exogenous factors effects on the morphofunctional status of a number of internal organs", state registration No. 0113U006185.

Oral cavity, which is part of the anterior digestive tube, plays an important role in the processes of food digestion, support of the teeth health and the body as a whole. The oral cavity mucous membrane with

the use of removable dentures is exposed to the influence of various negative factors [6]. Among the polymeric materials used by dental technicians and other specialists in the field of orthopedic prosthetics, the most adverse effects on human health are described under the influence of methylmethacrylate monomers and polymers [2].

The acrylic plastic over-denture, besides the traumatic, has a toxic and allergic effect on the denture-supporting area tissues in almost 40% of the patients using it [3]. Morphological study of oral mucosal changes in Wistar line rats under the effect of methyl methacrylate, a monomer of acrylic plastics, showed that with prolonged exposure to methyl methacrylate on the oral mucosa, at a concentration of 1% for 30 days, there were structural changes in all layers of the mucus that caused the development of toxic inflammatory process. Also, degenerative changes in epithelial cells are taking place, with signs of epithelium reparation, which is manifested by its hyperplasia, acanthosis, and focal hyperkeratosis [7]. In the works of many authors, changes in the action of methyl methacrylate on the gums status and the effects of the prosthesis on the teeth condition and the denture-supporting area were studied, but little attention was paid to the tongue status.

The morphometric method permits to objectify the results obtained in the organs' structural elements after the action of various endogenous and exogenous factors [1].

The purpose of the work was to determine the structural features of the mucous membrane of the tongue back dorsal surface in rats after the methacrylate administration.

Material and methods. The total of 25 white outbred male rats: control (5 animals) and experimental (20 animals) which oral cavity mucous membranes were treated with a 1% solution of methacrylic acid methyl ether had been involved in the study for 30 days [8].

After the euthanasia of animals on the 14th and 30th day, the fragments of the gum mucosa were sealed in epon-812 [4]. Semifine sections were stained with a polychrome stain. Morphometric study and microphotography were performed using Biorex-3 VM-500T microscope with digital DCM 900 photomicrographic attachment with adapted software for the given studies.

Quantitative assay of the morphometric study results and statistical processing of morphometric data were performed in accordance with generally accepted statistical methods using the Exel software[5]. The average thickness of the epithelial and proper mucous plates, the diameters of the arterioles, capillaries and venules lumen were determined. Management and manipulations with animals were carried out in accordance with the "Common Ethical Principles of Animal Experiments" adopted by the First National Congress on Bioethics (Kyiv, 2001), and also with the guidelines of the "European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes" [9].

Results of the study and their discussion. When performing morphometric studies on the tip of the tongue mucous membrane, it was found that the mean values of the epithelial plate's thickness were 73.82 ± 0.62 μm, the thickness of the plate itself was 15.87 ± 0.43 μm, and the height of the papillae's connective tissue was 37.56 ± 1, 39 μm (table 1).

Table 1

Dynamics of metric indices changes in the mucous membrane components in the tip of the tongue in rats after the action of 1% methacrylic acid ether (μm)

	Epithelial plate thickness	Proper mucous plate thickness	Papillae CT height
Control group	73.82±0.62	15.87±0.43	37.56±1.39
14th day	66.56±0.66 *	21.65±0.43 *	24.99±0.50 *
30th day	76.22±1.56 *	19.14±0.52 *,**	23.72±0.89 *

Note:* - P <0,05compared to the control group; ** - P <0,05 compared to the previous observation term.

On the fourteenth day of the study, the thickness of the epithelial plate was significantly reduced by 9.83%, compared to the control group (p <0.05) and made 66.56 ± 0.66 μm. The thickness of the proper mucous plate significantly increased by 36.42% (p <0.05) and was 21.65 ± 0.43 μm. The height of the papillae connective tissue on the fourteenth day was 24,99 ± 0,50 μm, that was by 33,47% lower than in the control group (p <0,05) (table 1).

On the thirtieth day of observation, an increase in the epithelial plate thickness of the tip of the tongue mucous membrane, which was 76.22 ± 1.56 μm, which is higher by 14.51% than in the previous experiment (p <0.05) and not reliably by 3.25% more compared to the control group. The thickness of the proper mucous plate decreased significantly by 11.59% (p <0.05) compared to the fourteenth day and amounted to 19.14 ± 0.52 μm, but it was significantly higher by 20.60% than in the control group (p <0 , 05).

The height of the papillae connective tissue decrease not reliably by 5.08% compared to the previous experiment, but it was reliably lower by 36.85% compared to the control group ($p < 0.05$). Its average values were 23.72 ± 0.89 μm (table 1).

In the morphometric study of the microcirculatory bed vessels in the tip of the tongue mucous membrane, it was found that in animals of the control group, the mean values of the arterioles lumen diameter were 11.09 ± 0.03 μm.

Table 2

Dynamics of metric indices changes of the hemomicrocirculatory bed's vessels in the tip of the tongue mucous membrane in rats after the action of 1% methacrylic acid ether

	Arterioles	Venules	Capillaries
Control group	11.09±0.03	13.50±0.08	4.86±0.01
14th day	8.09±0.04 *	12.96±0.04 *	5.85±0.03 *
30th day	10.03±0.09 *,**	13.14±0.02 *,**	5.93±0.02 *,**

Note:* - P <0,05compared to the control group; ** - P <0,05 compared to the previous observation term.

On the fourteenth day of the experiment, the diameter of the arterioles lumen decreased by 27.05% ($p < 0.05$) and equals 8.09 ± 0.04 μm. On the thirtieth day of the study, the diameter of the arterioles lumen reliably increased by 23.98% ($p < 0.05$), compared to the previous experiment period, and amounted 10.03 ± 0.09 μm. It was by 9.56%, reliably lower than the values in the control group of animals (table 2).

The mean values of the venules lumen diameter in the control group of rats were 13.50 ± 0.08 μm (table 2). On the fourteenth day of the experiment, mucosa venules lumen diameter in the tip of the tongue amounted 12.96 ± 0.04 μm, which was by 4% reliably lower than that of the control group ($p < 0.05$). On the thirtieth day of the study, the diameter of the venules lumen reduced reliably. The values amounted 8.14 ± 0.02 μm and were lower by 37.19% than the results on the fourteenth day of the study, and by 39.70% less than the values in the control group ($p < 0,05$) (table 2) .

In the morphometric study of the capillaries in the tip of the tongue mucous membrane, it was found that in the control group rats, the mean diameter of the lumen was 4.86 ± 0.01 μm (table 2). On the fourteenth day of the experiment, the capillaries lumen diameter increased by 20.37% compared to the control group ($p < 0.05$). Its values were 5.85 ± 0.03 μm. On the thirtieth day, the lumen diameter reliably increased by 1.37% ($p < 0.05$), compared to the fourteenth day of the experiment and amounted 5.93 ± 0.02 μm. Compared to the values in the control group of animals it increased by 22.02% (table 2).

Conclusion

The effect of 1% methacrylic acid ether on the tip of the tongue mucous membrane in rats manifests itself as the epithelial plate differentiation processes disorder in the form of hyperkeratosis. The proper mucous plate thickness increased during the observation due to the amorphous substance hyperhydration, which is accompanied by a decrease in the papillae connective tissue height. Changes in the hemicromicroculatory bed links are manifested by the resistance and capacity links narrowing on the 14th day of the experiment with a certain indices restoration on the 30th day. During the observation, the capillaries lumen expansion by 20% was established.

References

1. Yeroshenko GA, Kostylenko YuP, Skrypnikov MS. Korelyatsiyni zvyazky mizh morfometrychnymy pokaznykamy velykykh slynnykh zaloz shchuriv v normi i pislya stymulyatsiyi peryferychnoyi nervovoyi systemy. Svit medytsyny ta biolohiyi. 2009; 3(I): 64–69. [in Ukrainian]

2. Yeroshenko GA, Kramarenko DR, Semenova AK, Tymoshenko YuV, Herasymenko SB. Vykorystannya metylovoho efiru metakrylovoyi kysloty v suchasniy stomatolohiyi. Svit medytsyny ta biolohiyi. 2017; 2 (60):179-183. [in Ukrainian]

3. Yeroshenko GA, Senchakovych YuV, Kazakova KS, Bilash SM. Vplyv metakrylatu na funktsiyu slynnykh zaloz. Svit medytsyny ta biolohiyi. 2014; 1 (43):181-185. [in Ukrainian]

3. Karupu VYa. Elektronnaya mikroskopiya. Kiyev: Vyshcha shkola. 1984;208 s. [in Russian]

4. Lapach SN, Chubenko AV, Babich PN. Statisticheskiye metody v mediko-biologicheskikh issledovaniyakh s ispolzovaniyem Exel. Kiyev: Morion. 2000; 320 s. [in Russian]

5. Prodanchuk AI. Zabolevaniya parodonta i somaticheskaya patologiya. Molodoy uchenyy. 2015; (6): 290 – 293. [in Russian]

6. Romanova YuG, Novitskaya IK, Vit VV. Deystviye metilmetakrilata na slizistuyu obolochku polosti rta (morfologicheskoye issledovaniye) Eksperymentalna i klinichna medytsyna. 2012; (4) : 50–3. [in Russian]

7. Safarov AM. Sostoyaniye slizistoy obolochki proteznogo lozha pri syemnom protezirovanii. Visnyk stomatolohiyi. 2010; 2: 121-123. [in Russian]

8. European convention for the protection of vertebrate animals used for experimental and other scientific purposes. Strasbourg: Council of Europe. 1986; 53.

Реферати

СТРУКТУРНІ ОСОБЛИВОСТІ СЛИЗОВОЇ ОБОЛОНКИ СПИНКИ ЯЗИКА ЩУРІВ ПІСЛЯ ДІЇ МЕТАКРИЛАТУ

Єрошенко Г.А., Семенова А.К.

У роботі вивчено зміни структурних компонентів слизової оболонки спинки язика щурів після дії 1% ефіру метакрилової кислоти, які проявляються порушенням процесів диференціювання в епітеліальній пластинці у вигляді гіперкератозу. Товщина власної пластинки збільшилася протягом спостереження за рахунок гіпергідратації аморфної речовини, що супроводжується зменшенням висоти сполучнотканинних сосочків. Зміни в ланках гемомікроциркуляторного русла проявляються звуженням резистивної та ємнісної ланки на 14 добу експерименту з деяким відновленням показників на 30 добу. Протягом спостереження встановлено розширення просвіту капілярів на 20%.

Ключові слова: слизова оболонка, спинка язика, щури, 1% ефір метакрилової кислоти.

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СТРУКТУРНЫЕ ОСОБЕННОСТИ СЛИЗИСТОЙ ОБОЛОЧКИ СПИНКИ ЯЗЫКА КРЫС ПОСЛЕ ВОЗДЕЙСТВИЯ МЕТАКРИЛАТА

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В работе изучены изменения структурных компонентов слизистой оболочки спинки языка крыс после воздействия 1% эфира метакриловой кислоты, которые проявляются нарушением процессов дифференцировки в эпителиальной пластинке в виде гиперкератоза. Толщина собственной пластинки увеличилась в течение наблюдения за счет гипергидратации аморфного вещества, сопровождающейся уменьшением высоты соединительнотканных сосочков. Изменения в звеньях гемомикроциркуляторного русла проявляются сужением резистивного и емкостного звена на 14 сутки эксперимента с некоторым восстановлением показателей на 30 сутки. В течение наблюдения установлено расширение просвета капилляров на 20%.

Ключевые слова: слизистая оболочка, спинка языка, крысы, 1% эфир метакриловой кислоты.

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MORPHOMETRIC CHARACTERISTICS OF RAT SALIVARY GLANDS HEMOMICROVASCULATURE CAPACITY COMPONENT UNDER NORMAL CONDITIONS AND IN ETHANOL CHRONIC INTOXICATION

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Data of the morphometric study on chronic ethanol intoxication are presented in the paper. It has been established that chronic ethanol intoxication affects the capacitive link of the hemomicrovasculature of the submandibular salivary glands. At the early stages of observation, venules dilation is determined, which is confirmed by a significant increase in the outer diameter and the lumen diameter with the vascular wall thickness reduction. From the twelfth day the tendency is observed towards the metric indices restoration. Normalization of the indices is not determined by the thirtieth day.

Key words: chronic ethanol intoxication, rats, salivary glands, venules.

The work is a fragment of the science research project "Experimental-morphological study on the effects of the cryopreserved placenta transplants and other exogenous factors on the morphofunctional state of certain internal organs", state registration number 0113U006185.

The problem of alcoholism is considered to be topical all over the world and ranks third after cardiovascular and oncological diseases by the mortality rate. According to the WHO statistics, there are about 140 million people in the world suffering from chronic alcoholism, but the fact should be assessed that more than half of them refuse to seek assistance of health professionals. In Ukraine, there is a high level of alcohol consumption by adolescents and student youth, which is directly a socio-demographic issue concerning the entire population. To fight against alcohol, medical and social diagnostic techniques are used in many countries to find the best solutions for treatment and recovery of alcohol dependent people [1].

Scientists are increasingly focusing on the study of salivary glands. The interest of researchers in studying the patterns of the salivary glands response to various stimuli has recently increased significantly, which is due to the diagnostic value of saliva as a highly informative object for the clinical assessment of the whole body's state. Large salivary glands undergo special changes in this case, being highly sensitive to the action of physiological, pathogenic factors [2].

In human and animal saliva, substances affecting hemomicrocirculatory hemostasis, blood clotting ability and fibrinolysis have been detected. Interaction of the hemostasis system with lipid peroxidation reactions and antioxidant system is well-known. It can also be traced at estimating the salivary glands functions [3].

The state of the hemomicrovasculature parts has significant impact on the organs functioning, particularly its capacity component, which provides a fully functional outflow of blood from tissues,