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Реферати

ВЛИЯНИЕ 1% ЭФИРА МЕТАКРИЛОВОЙ КИСЛОТЫ И ФУЛЛЕРЕНА С60 НА МОРФОФУНКЦИОНАЛЬНОЕ СОСТОЯНИЕ ПЕЧЕНИ КРЫС

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В работе изучено влияние фуллерена С60 как потенциального гепатопротектора на структурную организацию печени крыс по сравнению с мономером для пластмасс горячей полимеризации. Установлено, что длительное поступление остаточного мономера из базиса акриловых протезов вызывает дистрофические изменения гепатоцитов и расстройства гемомикроциркуляции в печени крыс. Применение фуллеренов 60 на фоне действия 1% эфира метакриловой кислоты уменьшает дистрофические изменения в гепатоцитах и дисциркуляторные проявления в печеночных дольках, поэтому может рассматриваться на перспективу в качестве протектора органов пищеварительной системы при пользовании полными и частичными съемными протезами.

Ключевые слова: фуллерен С60, эфир метакриловой кислоты, печень, крысы.

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INFLUENCE OF 1% METACYRIC ACID ETHER AND FULLERENE C60 ON THE MORPHOFUNCTIONAL STATUS OF THE RATS' LIVER

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In the work the effect of fullerene C60 as a potential hepatoprotector on the structural organization of the liver of rats was studied in comparison with the monomer for hot polymerization plastics. It was found that the long-term supply of residual monomer from the base of acrylic prostheses causes dystrophic changes in hepatocytes and disorders of hemomicrocirculation in the liver of rats. The use of fullerenes 60 against the background of the action of 1% methacrylic acid ester reduces dystrophic changes in hepatocytes and discirculatory manifestations in the hepatic lobules, therefore, it can be considered as a protector of the digestive system when using full and partial dentures.

Key words: fullerene C60, methacrylic acid ester, liver, rats.

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HISTOMORPHOMETRIC STUDY OF EPITHELIAL LAYER OF HUMAN SPHENOIDAL SINUS MUCOSA

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Peculiarities of the morphological structure of the mucous membrane of the nasal cavity and paranasal sinuses should be considered while performing functional endoscopic interventions on the paranasal sinuses. To avoid the majority of pathomorphological errors, a diagnostician must be an expert in the morphological features of the study material. Therefore, a qualitative biopsy diagnostics requires detailing on the structure of the mucous membrane of different walls of the human normal sphenoidal sinus mucosa. The present study histomorphologically evaluated the homogeneity of the cellular composition of the pseudostratified ciliated columnar epithelium of the mucous membrane, lining the different walls of the human sphenoidal sinus mucosa. It has been found that each wall has its cytological picture, which in our opinion depends on certain functional purpose.

Keywords: sphenoidal sinus, mucous membrane, ciliated epithelium.

The paper has been written within the research scientific work, entitled "Consistent patterns of morphogenesis of organs, tissue and vascular nerves in health, disease and under the influence of external factors"; State registration number 0118U004457.

Peculiarities of the morphological structure of the mucous membrane of the nasal cavity and paranasal sinuses should be considered while performing functional endoscopic interventions on the paranasal sinuses [8, 9, 13]. Morphological inflammatory substrate is an alteration of the ciliated epithelium, which resulted in its desquamation and is a morphological substrate for the retardation of mucociliary transport and recurrence of the disease [6, 7, 11, 14]. Increased number of the goblet cells, squamous cell metaplasia of the respiratory epithelium, pronounced sclerotic changes in the lamina propria, deficiency of the regenerative process also indicates about irreversible changes in the epithelial lining of the paranasal sinuses [4, 5]. Therefore, a qualitative biopsy diagnostics requires detailing on the structure of the mucous membrane of different walls of the human normal sphenoidal sinus mucosa [7, 13]. Publications report about histological features that were found on different walls of the maxillary sinus,

cellular cavities of the ethmoidal labyrinth [3, 12]. In this regard, we conducted a thorough study of different regions of the sphenoidal sinus mucosa.

The purpose of the work was to perform histological and morphometric study of the pseudostratified ciliated columnar epithelium of the mucous membrane, lining the different walls of the human sphenoidal sinus mucosa.

Materials and methods. Histological study of the mucous membrane of the human sphenoidal sinus of 25 individuals (20 men and 5 women), died for the reasons not associated with the ENT- pathology, have been carried out. The sphenoidal sinus was studied at Communal Enterprise "Poltava Regional Bureau of Pathology and Anatomy".

To obtain the mucous membrane samples the access to sphenoidal sinus was made using the method suggested by Abrikosov A.I [1]. In this way, 2 ml 10% formalin solution was administered into the suinus with a syringe for 1-2 minutes for fixation and compression of the mucous membrane to obtain the sample. A compressed structure of the tissue enabled obtaining the mucous membrane from each separate wall of the sphenoidal sinus (except the superior one) for the spot study of the morphofunctional features of its structural elements.

After fixation in 10% formalin solution, histological material was embedded into paraffin according to conventional technique [2].

Sections were obtained by the microtome equipped with the section receiving tray (Microm HM-340) to prepare serial sections and carry out histological studies. Paraffin sections of 4-6 μm thick were stained with hematoxylin and eosin according to conventional technique, followed up with microscopic and morphometric study.

Morphometric measurements were performed in typical histostructural regions of the mucous membrane of human sphenoidal sinus. Not less than 200 cellular elements, previously magnified after microimaging by 2000 times, have been studied.

On the images, the large (D) and small (d) diameters of nuclei of cellular elements were measured, and two-dimensional empirical distributions were made up. The logarithm of the nuclei volume taken for the ellipsoid of rotation was calculated by the formula 1:

$$\lg V = \lg d^2 D k^3; \qquad (1)$$

where, D – large diameter of the nucleus, d – small diameter of the nucleus, k – magnification factor.

Histograms of the logarithm of the nucleus volume (karyogram) were made up for each observation and polymorphism of the nuclei in the presence of the peaks of nuclear classes was studied; the distance of the center of the nucleus from the basal membrane was also measured.

Mathematical data processing was carried out at the Department of Pathological Anatomy with Autopsy of Ukrainian Medical Stomatological Academy according to conventional methods adopted in morphology [10].

Results of the study and their discussion. Histomorphometric assessment of pseudostratified ciliated columnar epithelium, lining different walls of the sphenoidal sinus has been made. The findings of the research have established a certain cellular heterogeneity of the ciliated epithelium of the mucous membrane of the sinus.

Individual regions of the mucous membrane are covered with pseudostratified ciliated columnar epithelium containing numerous ciliated cells. The latter contain a large number of cilia on the apical surface, ensuring evacuation of dust particles due to its contractile properties. The nuclei of these cells are oblong or orbicular and are located near the apical surface. Goblet cells are arranged sporadically and contain a secretion that pushes off the nucleus slightly to the basal membrane. Microvillous cells occupy the middle location of the nuclei, and basal cells adhere directly to the basal membrane.

Submucous layer, containing microvessels without clearly defined lumen and surrounded by mesenchymal cells with elongated nuclei, is located beneath the basal membrane. This type of ciliated epithelium is found on the lateral walls of the sphenoidal sinus (fig. 1).

Regions of the sphenoidal sinus mucosa where mainly goblet cells are located, in contrast to lateral walls, have been found. This type of epithelium is presented in fig. 2. Thin sections stained with hematoxylin and eosin have shown that epithelium of the mucous membrane is comprised with goblet and basal cells. On their apical surface goblet cells have no cilia and are with bulb-shaped appearance. Depending on the phases of the secretory cycle, their nuclei are located either near the apical surface, or, due to the accumulation of secretion, the nuclei of the goblet cells are pushed off to the basal membrane. Intercalated cells are located directly on the basal membrane. These are small cells of pyramidal or prismatic form, their narrowed tops do not reach the surface of the epithelial layer. The submucosal layer of the sphenoidal sinus mucosa is represented by a loose connective tissue, which consists of numerous microvessels, as well as fibroblasts and fibrocytes. It has been found that the regions are located on the anterior and inferior walls of the sphenoidal sinus.

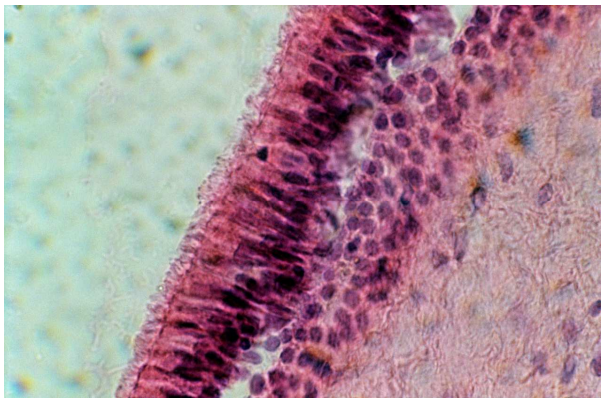

Fig 1. Structure of the pseudostratified ciliated columnar epithelium of the lateral wall of the sphenoidal sinus mucosa. H&E stain. 20×10 magnification.

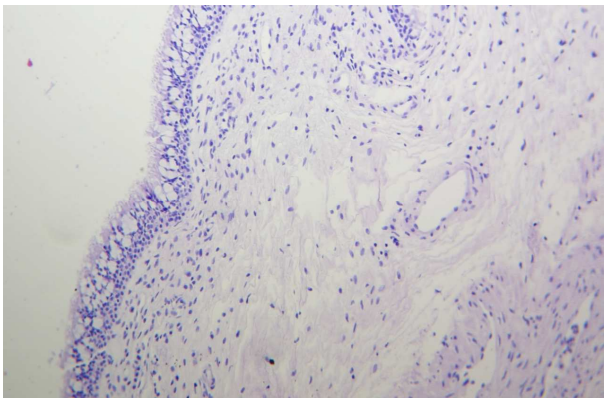

Fig 2. Mucous membrane of the anterior wall of the sphenoidal sinus. H&E stain. 10×10 magnification.

The findings of the study of serial histological sections showed that in the mucous membrane of the sphenoidal sinus posterior wall the growth zones of predominantly ciliated epithelium were found. The latter, unlike the multilayered ciliated epithelium of the previous walls, are characterized by the epithelial vegetations into underlying loose connective tissue. The connective tissue is separated from the epithelium by a fuzzy basal membrane, which contains basal cells. It should be noted that the growth zones are mostly represented by microvillous cells that have a chaotic location and different shape of nuclei. Along with the microvillous cells, goblet cells with different secretion content in the cytoplasm are constantly found, whilst the ciliated cells are sporadic. Submucous layer located in the growth zone consists of a loose connective tissue with a high content of microvessels (fig. 3).

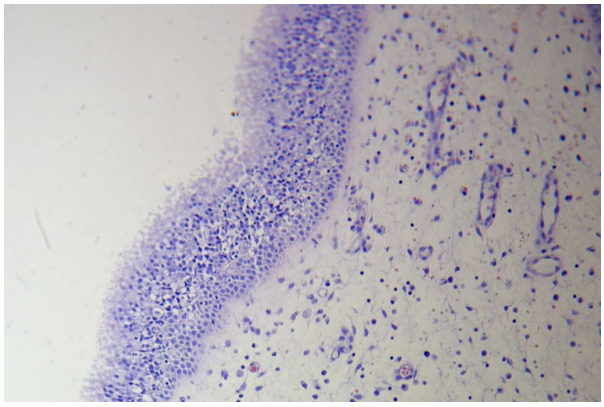

Fig. 3. Mucous membrane of the sphenoidal sinus posterior wall in the growth zone. H&E stain. 10×10 magnification.

In order to create a morphometric model of the localization of the pseudostratified ciliated columnar epithelium of different walls of the mucous membrane of the sphenoidal sinus, we carried out their karyometric studies with the measurement of the distance of the center of the nucleus of individual cells to the basal membrane and the measurement of the nucleus volume in a common logarithm. The results are shown in table 1.

Table 1

Morphometric indices of the pseudostratified ciliated columnar epithelium of the mucous membrane of different walls of the human sphenoidal sinus

Type of cell	Distance of the nucleus center from b/m, µm			Large diameter of the nucleus, µm			Small diameter of the nucleus, µm			Logarithm of the volume of nucleus		
	Medial and lateral walls	Anterior and inferior walls	Posterior wall	Medial and lateral walls	Anterior and inferior walls	Posterior walls	Medial and lateral walls	Anterior and inferior walls	Posterior wall	Medial and lateral walls	Anterior and inferior walls	Posterior wall
Basal	8.10± 0.20	7.00± 0.43	8.07± 0.11	7.40± 0.01	8.70± 0.30	7.16±0. 27	4.00± 0.06	5.30± 0.13	5.68± 0.23	1.52± 0.30	2.09± 0.02	2.06± 0.05
Long intercal ated	8.10± 0.20	7.00± 0.43	8.07± 0.11	7.40± 0.01	8.70± 0.30	7.16± 0.27	4.00± 0.06	5.30± 0.13	5.68± 0.23	1.52± 0.30	2.09± 0.02	2.06± 0.05
Goblet	16.00± 0.25	*14.03± 0.14 **18.0± 0.11	*14.07± 0.06 **17.9± 0.11	6.90± 0.44	*8.80± 0.20 **8.94± 0.30	*7.01± 0.37 **7.08± 0.30	3.40± 0.12	*5.20± 0.17 **5.50± 0.60	*4.79± 0.25 **5.50± 0.60	1.23± 0.30	*2.08± 0.03 **2.19± 0.07	*1.92± 0.05 **2.19± 0.07
Microvill ous	26.30± 0.30	-	20.28± 0.09	8.55± 0.34	-	7.18± 0.33	4.15± 0.23	-		1.29± 0.50	-	2.00± 0.08
Ciliated	39.79± 0.15	-	-	9.29± 0.44	-	-	4.00± 0.12	-	-	1.42± 0.20	-	-

*- Goblet cell at the phase of excretion;

**- Goblet cell at the phase of secretion.

The results of our morphometric studies indicate that basal cells are located directly on the basal membrane, whose nuclei are located at a distance of 8.1 ± 0.2 μm from the basement membrane and lVV 1.52 ± 0.3. It should be noted that between the lgV of the nuclei of short and long intercalated cells statistical reliability has not been found, which evidently testifies to their histogenetic affinity [8, 13]. In isolated goblet cells, the nucleus center distance from the basal membrane is 16,0 ± 0.25 μm and lgV 1.23 ± 0.3. Microvillous cells are at a distance of 26.3 ± 0.3 μm and lgV 1.2 ± 0.5. Finally, ciliated cells are most distant, their distance from the core center from the basal membrane is 39.79 ± 0.15 μm and lgV is 1.42 ± 0.2. The difference between lgV of the ciliated and microvillous cells is about 0,2, which, according to the Benninghoff caryometric law, indicates an integrative increase in the nuclei.

Consequently, the medial and lateral walls of the mucous membrane of the sphenoidal sinus are represented by a pseudo-layered, circular, cylindrical epithelium, and, in our opinion, consists of two different histogenetic components [6, 9]. The first of them is represented by short and long basal cells, and the other is represented by different in function goblet, microvillous and ciliated cells.

When conducting morphometric studies regarding the composition of the cellular elements of the pseudo-layered ciliated epithelium of the anterior and the inferior walls, we found that the nuclei of short basal cells are at a distance of 4.67 ± 0.3 μm from the basal membrane, IgV 2.14 ± 0.03, nuclei of long basal cells are located at a distance of 7.0 ± 0.43 μm, lgV 2.09 ± 0.2, the centre of the nuclei of goblet cells in the phase of secretion is removed from the basal membrane by 14.03 ± 0.14 μm, lgV is 2.08 ± 0.03, and the nuclei of the goblet cells in the phase of secretion are removed from the basal membrane by 18,4 ± 0.11 μm, lgV - 2.19 ± 0.07.

In this work we carried out cariometric studies of pseudo-multilayer, ciliated, cylindrical epithelium of the mucous membrane of the posterior wall of the sphenoidal sinus. Center of nuclei of basal cells 8.07 ± 0.11 μm, lgV nuclei of cell data 2.06 ± 0.05. Microvillous cells have a logarithm of the volume of nuclei 2.0 ± 0.08, centres of their nuclei are at a distance of 20.08 ± 0.09 μm from the basal membrane. The nuclei of the goblet cells, depending on the secretion phase, are located either at a distance of 14.07 ± 0.6 μm or 17.94 ± 0.11 μm and lgV varies from 1.92 ± 0.05 to 2.19 ± 0.07.

The monitoring of the results of morphometric studies of the posterior mucous membrane of the clavicular sinus with the predominant location of the growth zones indicates that it is in this area, different from the previous types of epithelium, that it is established on the base cells of the clinical clinical, which are connected with the goblet-like, and with the cluster cells [7, 8, 9, 13].

Conclusions

It has been established that different walls of the human sphenoidal sinus mucosa have their cytological features. Thus, the findings of our research have found that the lateral walls are covered with pseudostratified ciliated columnar epithelium with predominant content of the ciliated cells, the anterior and inferior walls of the sphenoidal sinus mucosa are represented mainly by the goblet cells, and on the posterior wall, which contains a large number of growth zones, microvillous cells are located alongside the basal cells.

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Реферати

ГІСТОМОРФОМЕТРИЧНЕ ДОСЛІДЖЕННЯ ЕПІТЕЛІАЛЬНОГО ШАРУ СЛИЗОВОЇ ОБОЛОНКИ КЛИНОПОДІБНОЇ ПАЗУХИ ЛЮДИНИ

Совгиря С.М.

При виконанні функціональних ендоскопічних втручань на приносових пазухах необхідно враховувати особливості морфологічної будови слизової оболонки порожнини носа і приносових пазух. Щоб уникнути більшості патоморфологічних помилок, лікар-діагност повинен чітко розумітися на морфологічних особливостях матеріалу дослідження. Тому для якісної біопсійної діагностики необхідна деталізація будови слизової оболонки різних стінок клиноподібної пазухи людини в нормі. В даному дослідженні гістоморфологічними методами оцінювались однорідність клітинного складу псевдобагатошарового війчастого циліндричного епітелію слизової оболонки, що вистилає різні стінки клиноподібної пазухи людини. Було встановлено, що кожна стінка має свою цитологічну картину, яка, на нашу думку, залежить від певних функціональних обов'язків.

Ключові слова: клиноподібна пазуха, слизова оболонка, війчастий епітелій.

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ГИСТОМОРФОМЕТРИЧЕСКОЕ ИССЛЕДОВАНИЕ ЭПИТЕЛИАЛЬНОГО СЛОЯ СЛИЗИСТОЙ ОБОЛОЧКИ КЛИНОВИДНОЙ ПАЗУХИ ЧЕЛОВЕКА

Совгиря С.Н.

При выполнении функциональных эндоскопических вмешательств на околоносовых пазухах необходимо учитывать особенности морфологического строения слизистой оболочки полости носа и околоносовых пазух. Чтобы избежать большинства патоморфологических ошибок, врач-диагност должен четко разбираться в морфологических особенностях материала исследования. Поэтому для качественной биопсийной диагностики необходима детализация строения слизистой оболочки различных стенок клиновидной пазухи человека в норме. В данном исследовании морфологическими методами оценивались однородность клеточного состава псевдомногорядного мерцательного цилиндрического эпителия слизистой оболочки, которая выстилает разные стенки клиновидной пазухи человека. Было установлено, что каждая стенка имеет свою цитологическую картину, которая, по нашему мнению, зависит от определенных функциональных обязанностей.

Ключевые слова: клиновидная пазуха, слизистая оболочка, мерцательный эпителий.

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УЛЬТРАСТРУКТУРНІ ЗМІНИ СКОРОТЛИВОГО АПАРАТУ МІОКАРДА ШЛУНОЧКІВ ЩУРІВ НА ЕТАПАХ ПРЕНАТАЛЬНОГО ОНТОГЕНЕЗУ В НОРМІ ТА ПІСЛЯ ДІЇ АЛКОГОЛЮ

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Відомості про формування скоротливого апарату серця і розподіл міофібрил у кардіоміоцитах за умов внутрішньоутробної інтоксикації етанолом залишаються предметом значних суперечок. Метою дослідження було визначення змін ультраструктури скоротливого апарату кардіоміоцитів шлуночків серця щурів під час пренатального розвитку за умов внутрішньоутробної алкогольної інтоксикації. Визначено, що хронічна алкогольна інтоксикація під час пренатального кардіогенезу ушкоджує скоротливий апарат кардіоміоцитів шлуночків за рахунок дезорганізації структури саркомерів, фрагментації та дезорієнтації міофібрил, значного пригнічення саркомерогенезу, зниження вмісту міофібрил, що асоційовано з деструкцією мітохондрій. Виразність змін у даних структурах залежить від зони та терміну розвитку ембріона. Найбільш істотні зміни обумовлені прямою токсичною дією етанолу і відбуваються на ранніх термінах кардіогенезу.

Ключові слова: пренатальний онтогенез, алкогольна інтоксикація, міокард шлуночків, міофібрили, ультраструктура.

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Скоротливий апарат кардіоміоцитів являє собою високо організовану структуру, яка включає у себе міофібрили, елементи Т- та L-систем. Саркомер поперечно-посмугованого м'яза змінюється за будовою та складом білків по всій довжині міофібрили, проте існують три головні компоненти – тонкі нитки, товсті нитки і Z-диски – кожний з яких розвивається за допомогою численних взаємодій з білками, що беруть участь у скороченні [9, 13, 14]. Міофібрилогенез – це складний процес, який являє собою утворення і розподіл міофібрил у кардіоміоциті, формування скоротливих білків і утворення саркомерів [5, 7, 12]. Порушення на одному з цих етапів розвитку ембріонального серця під дією ушкоджуючих факторів можуть призвести до формування численних патологій серцево-судинної системи та надалі викликати летальний результат.