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Research Article

CHARACTERIZATION OF MORPHOLOGICAL AND MORPHOMETRIC CHANGES IN THE BRONCHIAL WALL IN RABBITS DURING ACUTE EXPERIMENTAL PNEUMONIA

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ABSTRACT

This article presents the results of the study of changes observed in the mucosa and submucosa of the bronchial wall after inducing experimental pneumonia in rabbits. The investigation was carried out on 24 adult rabbits weighing 2-2,5 kg. The experimental rabbits were examined 3, 15, 30 days after induction of pneumonia. Data from 6-7 rabbits in each period were analysed.

KEYWORDS

Bronchus, pneumonia, bronchial glands, submucosa, goblet cell.

INTRODUCTION

the disease of pneumonia among children took one of the leading places. Despite the high effectiveness of the new antibiotic treatment under development, pneumonia remains one of the 10 main causes of death in economically developed countries. According to some scientists, child mortality from non-hospital pneumonia is an average of 13.1% per 100,000 children. In addition, newborns (13.5% of 100,000 live births), as well as infants and young children with weakened immune systems due to various factors, also survive to above the mortality rate from pneumonia. [1,3]. Acute pneumonia falls to 10-25 cases per 1,000 children in the early neonatal period, while older children have 5-8 cases per 1,000 [4,6].

This emphasizes the importance and relevance of methods for determining the etiology and pathogenesis of the infectious process in pneumonia. One of the currently important tasks of Advanced Pediatrics requires the search for effective methods of

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diagnosing and treating acute pneumonia. Together with this, some pathological changes in the disease of pneumonia, in which children are observed, remain problematic [2,5,7]. Based on the above information, it can be noted that the chosen topic is dolbzar.

The purpose of the study. Study of the nature of morphological and morphometric changes in the bronchial glands in acute experimental pneumonia disease caused by rabbits.

Materials and research methods. As a material, the study was carried out in adulthood with an experimental - induced acute pneumonia-tissue fragments from large and medium-caliber bronchi (18 rabbits) fragments of adult rabbits, as well as 6 large and medium-caliber bronchi fragments of healthy rabbits of the same age were taken as a control. M. to cause acute experimental pneumonia.I.Zakharevsky and N.I. Created by Anichkov and L.V Yashchenko and N.T. A modified method was used from the sides of Reichlin (1981).

Incisions from tissue fragments obtained for the study were dyed with hematoxylin – eosin, picrophoxin on Van gizon, Masson method, Weigert method as well as Altsian caustic method to detect Musin. Morphometric examination of the bronchial mucosa g.G.It was carried out using an ocular-micrometer recommended by Avtandilov. Based on the results obtained during the investigation, statistics, the method of styling (programma Statistica 6.1 (Statsoft Inc., R SSHA).

Research results: experimental pneumonia disease modeling on Day 3 when animals are examined with their chest opening, the surface of the pleural sheets is shiny and moist. Large to medium caliber bronchial cavities are noted to be reddish-pink in color with a small amount of slimy mass. Moderately swollen when grabbing lung tissue, its small foci of different density are identified in different segments. In the study of histological preparations, large-caliber bronchi are noted that the mucous membrane is unevenly thickened, unevenly folded, there are infiltrates on the surface of the mucous membrane consisting of lymphocytes, neutrophils and macrophages. In the multi-row ciliated epithelium, which covers the mucous membrane of the bronchial wall, the number of rows of cells is in a relatively reduced state. The cilia of the prismatic cells of the multi-row Cilia epithelium are found to be in a position where the cilia are relatively close to each other and many cilia are interleaved (Figure 1). When stained with the method of altian breast, in combination with an increase in the number of goblet cells, there is an accumulation of a large amount of secrete product in the cytoplasm of the basal part of these cells. Swelling of the private plate is observed, as a result of which the fibration – relaxation of collagen and elastic fibers in the private plate is noted. There is a process of fullness and hemostasis in the blood vessels. Lymphostasis is also observed in lymphatic capillaries. Under the mucous membrane there is a derivative consisting of a set of epithelial cells, namely serous and mucosal secrotor cells, which make large and medium-caliber bronchi appear large-bright in parts of the mucous membrane where there is no hyaline fibrosis-lower area, a certain part of the cytoplasm is considered bronchial glands, which appear optically empty, and a basophilic Oval nucleus The excretory ducts of these glands penetrate towards the bronchial mucosa and open on the surface of the ciliated epithelium. The stroma of their glands is made up of connective tissue unums. In combination with this, there are muscle fibers between the release channels of these bronchial glands (Figure 2). 3 days of the disease of experimental pneumonia, when lymphocytes, neutrophils and macrophages accumulate around the bronchial glands located in the large and medium-caliber bronchial mucosa, in the

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mucous glands, when stained by the method of alcian breast, hypersecretion of glandular contents is observed, which indicates an increase in their functional activity.

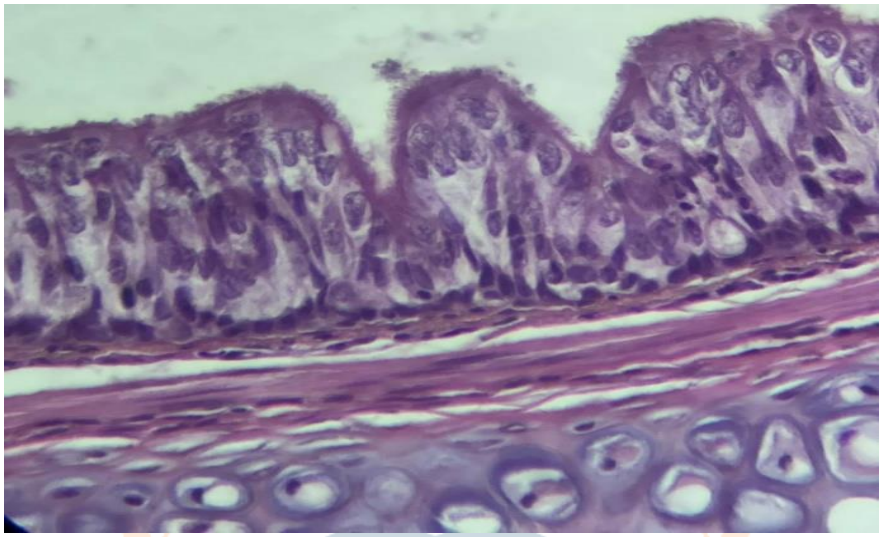

Figure 1. The bronx wall in 3 days of experimental pneumonia disease. Hematoxylin is stained with eosin. Ob.10, OK 40.

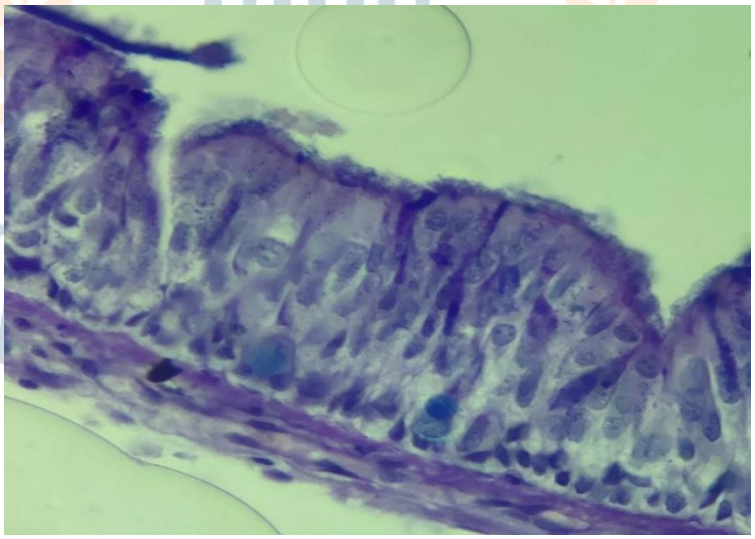

Figure 2. The bronx wall in 3 days of experimental pneumonia disease. Painted with Altsian breast. Ob.10, OK 40.

There are no significant changes in fibrosis – togai floor fertility. The hymenium is made up of smooth muscle fibers consisting of fuchsinophilic collagen fibers and chondroblast cells, a tufted bundle with picrinophilic staining properties. Elastic and collagen fibers located in the upper membrane of the colon have passed directly to the outer adventitial layer of the bronchi, no change is detected to this layer either.

Experience in this period is determined by the fact that all the parameters of the height of the mucous

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membrane layer of large and medium-caliber bronchi in the foci have significantly increased. While the large-caliber bronchi had 47.3 μm, the medium-caliber bronchi had 35.2 μm, the large-caliber bronchi had a private plate thickness of 14.3 μm, and the medium-caliber bronchi had 10.7 μm. The height of the mucous membrane of the large-caliber bronchi is 80.9 μm, and in the middle-caliber bronchi-66.5 μm. Compared to the results in the control group of 3 days of experimental acute pneumonia, it is found that large-caliber bronchi thickened by 2.7 μm compared to the norm, while medium-caliber bronchi thickened by 2.5 μm, on average by 2.6 μm. On the 3rd day of the disease of experimental pneumonia, the bronchial glands in the mucous membrane of large-caliber bronchi have an average number of 12.4 in 1 cm2 places, the length of the initial sections of the glands is an average of 0.37 mm, the width of the initial section of the glands is an average of 25.4 mm. When the number of bronchial glands increased by 0.91 times compared to the control group, while the length increased significantly by 6.1 μm, the width of the initial sections of the glands increased by 5.7 μm.

Table 1.

Thickness of layers of the mucous membrane and mucous membrane of the bronchi (mkm), (n -10)in rabbits with experimental pneumonia disease in the 3rd, 15th, 30th days of the study

Tracking dates	Bronchi of different sizes	Multi-row epithelial scales	The thickness of the private plate of the multi-row epithelium	Thickness of the mucous membrane
(day)	Large	46,4±0,7	11,6±0,3	76,4±0,2
	Middle	34,3±1,2	8,1±1,3	62,3±1,1
3	Large	47,3±0,93	14,3±0,81	80,9±0,94
	Middle	35,2±0,91	10,7±0,78	66,7±0,93
15	Large	50,1±0,89	17,2±0,68	83,7±0,89
	Middle	37,7±0,86	12,4±0,63	69,6±0,87
30	Large	52,7±0,84	20,6±0,51	85,1±0,86
	Middle	40,6±0,80	13,7±0,59	70,4±0,83

Table 2.

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Rabbits with experimental pneumonia on 3, 15, 30 days of the study comparative morphometric indicators of the bronchial glands of the large-caliber bronchial wall mucosa (mm), (n -10)

Tracking dates (day)	1 cm2 Average amount of bronchial glands	Length of the starting section of the glands of the Bronx wall	Length of the starting section of the glands of the Bronx wall
Назорат	8,3±0,9 (7-11)	0,31±0,02 (0,20-0,42)	0,23±0,08 (0,12-0,34)
3	12,4±1,8 (10-20)	0,37±0,02 (0,24-0,30)	0,25±0,05 (0,24-0,34)
15	14,7±1,3 (15-25)	0,43±0,05 (0,39-0,48)	0,29±0,06 (0,32-0,40)
30	16,4±0,7 (19-27)	0,45±0,07 (0,36-0,54)	0,31±0,08 (0,34-0,45)

On 15 days of modeling experimental acute pneumonia, the mucous membrane of large and medium - caliber bronchi is hyperimated when macroscopic vision, in their cavities there is an exudate with a mucous-purulent composition. When the lung tissue is caught and cut, small, medium-sized gray-pink relatively condensed foci are detected in its various areas, leaving them in a position where most are joined by one. Microscopic examination of the mucous membrane of large and medium-caliber bronchi reveals increased infiltration with lymphocytes, macrophages, and segment-core neutrophils than previous deadlines. Most of the cilia of the ciliated epithelial cell are found to be in an attached position and disconnected from the cell surface. Due to the strengthening of proliferative processes in it, a sharp increase in thickness is detected. In the epithelial plate, an increase in the number of goblet cells compared to the norm is observed, as well as their occurrence in hypertrophy. An increase in alterative and exudative reactions is also observed in the private plate of the epithelium. It was noted that the swelling, choking and fibration (loosening) of the fibers of the connective tissue is even more intense compared to experimental animals of the previous group. They show increased picrinophilicity. Lymph and vascular capillaries are enlarged, full-fledged, in which hemostasis and lymphostasis are detected. There is a large accumulation of lymphocytes among connective tissue fibers, infiltration with macrophages and segment-core neutrophils. At the same time, an increase in the number of fibrocytes and fibroblasts is also observed (Figure 3).

Hypertrophy of secretory cells and their hypersecretion were observed in the bronchial glands located on the private plate. In the cytoplasm of the cells of the bronchial glands there is a substance with a large amount of mucous content. The excretory ducts

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of the glands were enlarged and reached the bronchial cavity in a state filled with mucus (4 photos). Fibrosis-swelling and fibrillation of collagen fibers in the upper membrane of the lower floor is observed. The structure of the adventitious floor is unchanged.

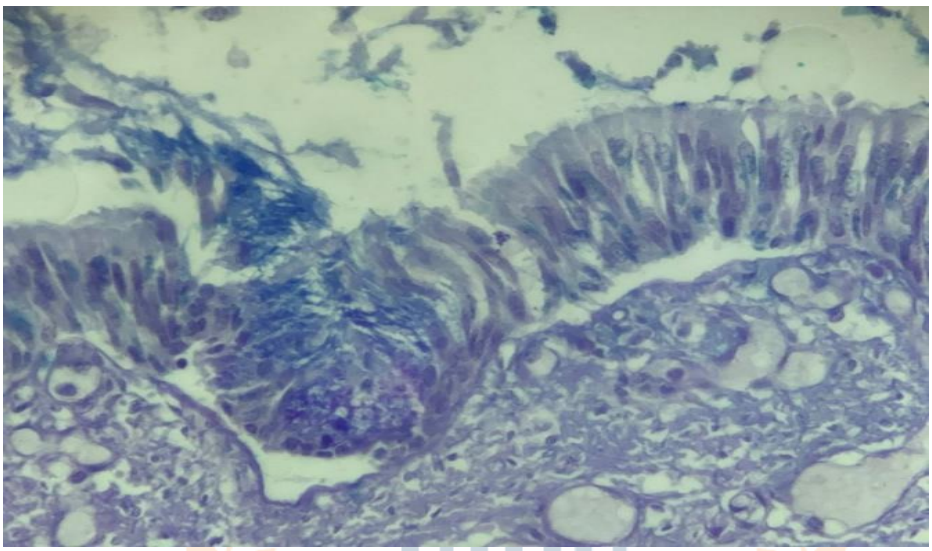

Figure 3. The bronx wall on 15 days of experimental pneumonia disease. Painted by Masson method. Ob.10, OK 20.

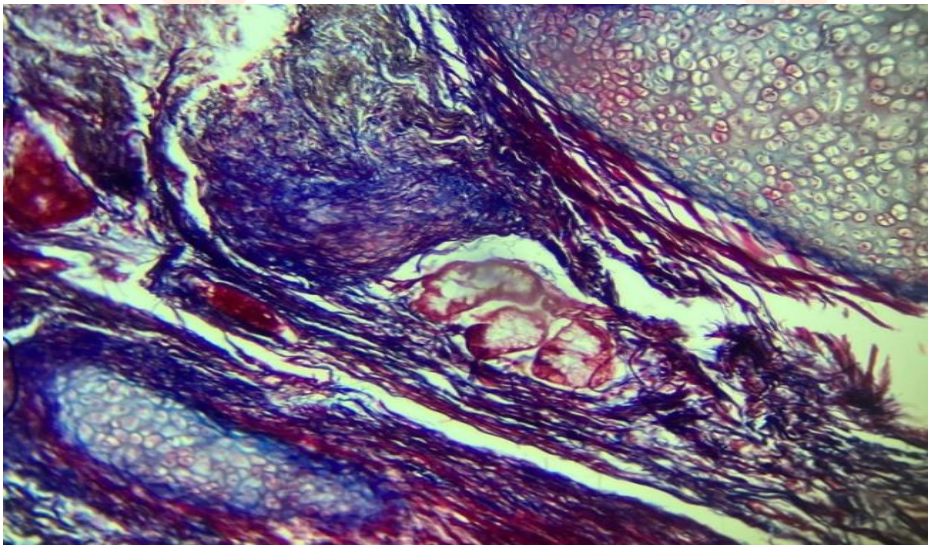

Figure 4. The bronx wall on 15 days of experimental pneumonia disease. Painted by the method of alcian breast. Ob.10, OK 40

The experiment, in which the condition of acute experimental pneumonia was caused, accounted for the following results by 15 days of the height of the mucous membrane layer of bronchi of various calibers

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obtained from haimans. In large caliber bronchi, the thickness of the epithelium in the mucous membrane was 50.1 μm, in medium caliber bronchi 37.1 μm, while in large caliber bronchi, the thickness of the private plate is 17.2 μm, in medium caliber bronchi 12.4 μm. The height of the mucous membrane of the large-caliber bronchi is 83.7 μm, and in the middle-caliber bronchi it is found that in comparison with the results in the control group, large-caliber bronchi thicken to 4.6 μm, and medium-caliber bronchi to 6.4 μm, on average 5.49 μm.

In experimental conditions, the number of bronchial glands in the mucous membrane of large-caliber bronchi 15 days after the cause of pneumonia was on average 14.7 at 1 cm2, while the length of their excretory duct is on average 0.43 mm, and the width is on average 0.29 mm. Compared to the control group, the number of bronchial glands increased by 1.18 times, while the length increased significantly by 0.5 mm, the width increased by 0.7 mm. Relying on this data, it turns out that the length of the bronchial gland release channel occurs more than its width.

Macroscopically on the 30th day of modeling experimental pneumonia disease, the mucous membrane in all bronchi is in a swollen, red-pink hyperimied state, in the cavities of which there is a large amount of mucous purulent exudate. When capturing lung tissue small, medium-sized gray-pink condensed foci are detected in its various areas, leaving them in a state where most are joined by one, when cutting these foci the light pink is separated by a relatively dull foamy liquid. Microscopically, it is determined that the cells of the mucous membranes of the large and middle bronchi are desquamated. They are infiltrated by a large number of lymphocytes, macrophages, and segment-core neutrophil cells. The thickness of the mucous membrane increased sharply by 8.4 μm compared to the control group. Swelling of the private plate under the epithelium, enlargement of lymph nodes in size, accumulation of large amounts of lymphocytes, monocytes, macrophages, fibroblasts and fibrocytes are observed (Figure 5). Accumulation of plasma cells is also seen in some areas. In small blood vessels, a condition of blood fullness and hemostasis is noted. Lymphostasis in lymphatic capillaries. Collagen fibers are thickened, picrinophilicity is observed. The elastic fibers of the private plate are loosely fibrous. Infiltration of inflammatory cells is also observed between muscle fibers. The picrinophilia of muscle fibers in some areas alternated with weak fuchsinophilia. The cilia of the multi-row Cilia epithelium are overlapping with the account of inflammatory exudates, in many areas there is a desquamation of epithelial cells. It turns out that the goblet cells of the epithelial plate are hypertrophied, the cytoplasm is a state filled with a secret product. Under the multi-row ciliated epithelium, there is also swelling of the private plate, fibrillation of elastic fibers of connective tissue, the accumulation of fibroblasts and fibrocytes between them. In many areas, collagen fibers are fucsinophilic, thickened, and increased in number, but there are also few foci of picrinophilia. Some areas of muscle fibers have fuchsinophilia, in which lymphocytes, macrophages, and neutrophil cell infiltration are detected. There is an increase in the number and volume of lymph nodes, as well as cases of Hemostasis and lymphostasis in small blood vessels. The bronchial glands located under the mucous membrane form large groups. The cells of the glands are hypertrophied and foamy, in a state filled with a bluish mucus secretion substance. The excretory ducts of these bronchial glands are dilated. An accumulation of infiltrates consisting of a lymphoid cell is detected around the excretory ducts of the glands. Focal fibrosis and growth of adipose tissue are recorded around the terminal parts of the glands (Figure 6).

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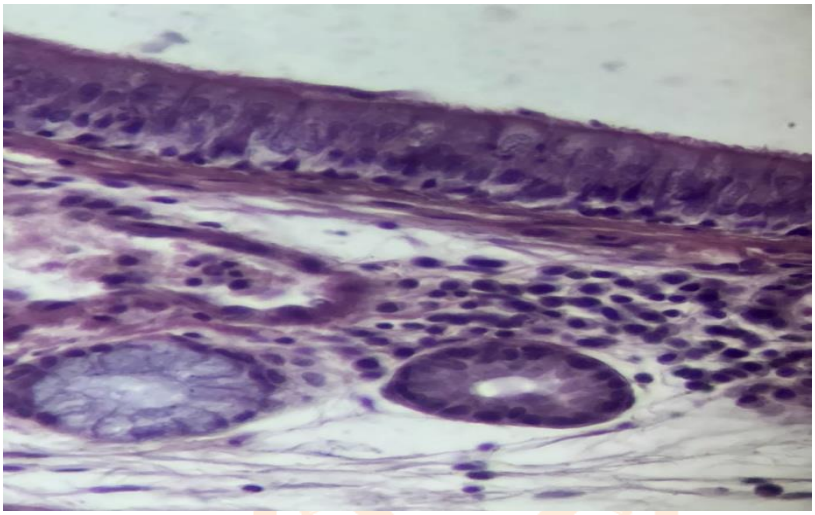

Figure 5. The bronx wall on 30 days of experimental pneumonia disease. Hematoxylin is stained with eosin. Ob.10, OK 40.

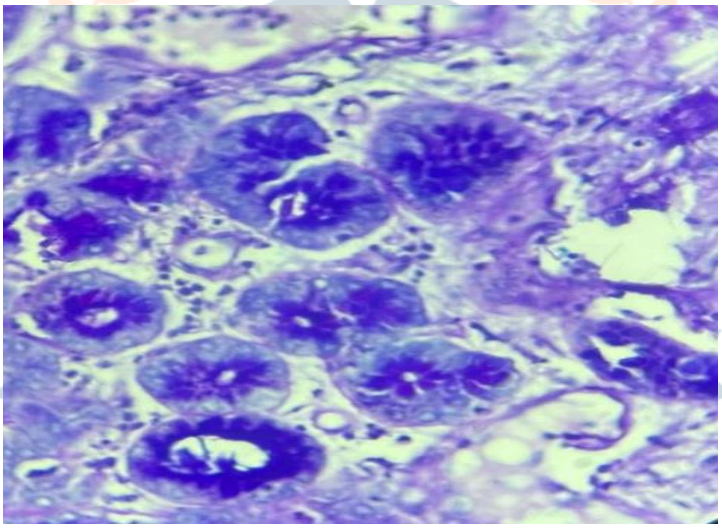

Figure 6. The bronx wall on 30 days of experimental pneumonia disease. Painted with Altsian breast. Ob.10, OK 40.

A number of changes are observed in the lower floor of the bronchi fibrosis - collagen fibers are slightly loosened i.e. fibrous. In the deep layers there are thick fuchsinophilic fibers that combine into a homogeneous mass. In chondrocyte cells, the process of vacuolization and cariopycnosis is observed. No changes were detected to the Bronx outer Adventist floor.

By 30 days of acute experimental pneumonia, the mucous epithelium thickness in large-caliber bronchi was 52.7 μm, in medium-caliber bronchi 40.6 μm, while the private plate thickness of large-caliber bronchi was 20.6 μm, in medium-caliber bronchi 13.7 μm. The height of the mucous membrane of the large-caliber bronchi is 85.1 μm, and in the middle-caliber bronchi-70.4 μm, compared to the results in the control group, large-

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caliber bronchi are found to thicken the thickness of the mucous and mucous membranes on average 8.7 μm, and medium-caliber bronchi-6.66 μm.

By this period of the experiment, the number of bronchial glands in the mucous membrane of large-caliber bronchi was on average 16.4 in an area of 1 cm2, while the length of their excretory duct is on average 0.45 mm, and the width of the excretory duct of the glands is on average 0.31 mm. Compared to the control group, the number of bronchial glands increased by 2.1 times, it is found that the width of the bronchial gland release channel increased by 1.67 times, and the length of the bronchial gland release channel increased by 1.45 times.

CONCLUSION

The change in the structure of the epithelocyte cells and private plate of the mucous membrane of the bronchi was observed from the 7th day of pneumonia, which was called in the experiment, and as the process continued, that is, in the later periods of the experiment, their exacerbation was observed - progressive thickening of the multi-row Cyprian epithelium on the mucous membrane. It was noted that goblet cells in the mucous membrane undergo hypertrophy as well as hyperplasia and accumulate a large amount of secretory products in their composition. In the early stages of the experiment, hypertrophy and hyperplasia of secretory and mucosal cells were observed in the bronchial glands in the mucous membrane of the wall of large and medium-caliber bronchi, the accumulation of a large amount of products in the structure of secretory cells, the length and width of the excretory channels of the glands.

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