Histological study of the interaction of the escherichia with epithelium of the small intestine of rats

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INTRODUCTION

Modern theories of the pathogenesis of infectious disease explain the specificity of morphological changes of the biological properties of specific pathogens. Naturally, much attention is given to the stage of interaction of the body's cells, which marks the beginning of the infectious process and during which the pathogen penetrates into the cells. The study of the interactions of microbes with the cells of animals allows a deeper understanding of the pathogenesis of some infectious diseases. Of particular interest is the study of the interaction of pathogenic and conditionally pathogenic microorganisms with the intestinal epithelium, performs an important barrier function in the body [1, 2]. In recent years, the spread of the leading hypothesis signify in the pathogenesis of enteric infection ability of E. coli penetrate the intestinal epithelial cells and reproduce in them. The ability of virulent strains of E. coli to the invasion is an important feature of these bacteria [3].

Essential conditions for the effective development of animal husbandry are: maximum saving newborn young farm animals and reduce their incidence. Among the diseases young animals are widespread and cause the most economic damage of gastro-intestinal illness, causing a large loss, which accounts for more than 80% of the total deaths, lack of growth and development, the leading place in the registered pathologies lambs takes escherichiosis [4, 5].

Escherichiosis widespread infectious disease of young farm animals, causing high mortality rate, as well as growth and declining productivity from having sick animals. Causative agents of diseases are representatives by Escherichia, 170 more than 10000 and serogroup of serological results [6]. Diseases of young farm animals continue to be one of the major reasons hampering the development of livestock and causing him significant harm. In recent years, on the territory of Kazakhstan and abroad escherichiosis is almost universally [7, 8].

One of the most common ways infectious diseases occur in otherwise healthy farms is through the introduction of clinically healthy vectors. Collinfection, etiologically related to enteropathogenic E. coli (EPEC) is a persisting problem in a number of countries [9, 10, 11, 12].

The purpose of this study was to examine the features of direct interactions of E. coli with enterocits of the ileum of rats.

Technique. In the experiments used the 12 rats, of which 3 were in the control group. Rats of test groups were infected orally by 12 hour's bouillon culture of E. coli in the dose of 200 CFU. Animals slaughtered through 24 hours after infection. In all cases carried out morphological study.
For histological study of animals were taken pieces of the ileum, fixed with 10% solution of neutral formalin. This samples were washed with water, dehydrated by posting through the spiritus rectificati of increasing strength and poured into paraffin wax using a generally accepted method (Merkulov G.A., 1969). From prepared thick slices did paraffin blocks 4-6 µm and pasted on the slides. The sections were stained with hematoxylin-eosin. For the differentiation of cellular elements has used coloring Azur-eosin 11 stains according Romanovsky-Giemsa.

The main part:

For histological study were taken pieces of the intestinal wall with the most severe inflammatory changes distinctly average obtained by visual observation. In light microscopy and histological cuts of the test groups defeated guts in all cases was the nature of desquamative catarrhal inflammation. In control group histological examination of intestines changes were detected no there expressed disorders of blood circulation. The architectonics of the intestinal wall has not changed. Histological study of the first signs of dystrophic changes of epithelial cells appeared to 12 h. when the epithelial layer flabbining, the enterocits purchased the cubic form and began their exclusion from the surface of the pillus. Both have undergone changes and intercellular contacts, as evidenced by the widening of intercellular spaces, the rounding of individual cells and release them from the neighbouring cells.

Fig. 1: Thin bowel division.

In the clearance of the crypt E. coli were groups, were surrounded by moderately electron-dense material, which appears to be the secret of Goblet cells. However, if the microbes are surrounded with a completely secret of Goblet cells, there has been no direct contact with the apical cell surface. Often E. coli are located in the immediate vicinity of the surface of prismatic cells. When germs from the apical surface of prismatic cells cause lint, they find themselves immersed in the glycocalyx, which well expressed in this area. The apical portion of the cell enlightening and devoid of organelles. It seems that it is filled with filaments having a direct link with filaments micropilis. Terminal system in such cells expressed poorly. The penetration of germs in the cells of the pillus is not detected.

While infecting by E. coli ultrastructural changes observed primarily in the crypts of plasmatic cells through the 24 h. after the infection of the microbes. Area of enlightenment of apical parts of the cells crypts greatly increases. It is noteworthy that in the vicinity of the areas biggest changes cellular surfaces were microbes with a bright halo. If there is a violation of the integrity of plasma membrane there is free passage of E. coli into the cage. Microbes, penetrated enterocits, are free in the cytoplasm in groups or singly. After the passage of E. coli in the cell is the apical surface of the enterocits apparently recovers quickly, as the micropillis of cell affected little differed from that of control cells. In cell microbes were both in apical and basal parts, they are not subject to visible changes for their digestion in a cell.

Conclusions:

Studies established that E. coli penetrated crypt of cells of rats. The results of the study are different from data Takeuchi (1971) showed that E. coli in Guinea pigs are mainly in the pillis of enterocits of ileum. Thus, E.
coli penetrate into the cell of rats, after violating the integrity of plasma membrane. Indicated that they are located in cytoplasm freely, not in the original vakuola as on guinea pigs. In separate enterocits thus introduced modified Escherichia. On the damaged appeared leukocytes and lymphocytes. The largest number of E. coli in the face of atherosclerosis is detected through 24 h. after infection. The microbes were found in most sections of the lower parts of the crypt, where cells Paneta, in different functional status. In the clearance of the crypt E. coli are groups, are surrounded by a moderately electron-dense material.

Through the 18 h. after infection these changes progressed. The architectonics of the mucous membrane is further compromised. Pillis are thickened, shortened and almost all along denied the epithelium, rose circulatory disorders and swelling.

REFERENCES