

MORPHOLOGICAL CHARACTERISTICS OF THE WALL OF RATS' ILEUM WHEN USING A FOOD ADDITIVES COMPLEX

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Introduction.

Taste plays an essential role in human life, which is connected not only with the ability to recognize poor-quality food but also with the ability to evaluate its organoleptic properties. Therefore, the problem of the quality of food products, considering the significant number of food additives widely used in the food industry, remains highly relevant. According to literature data, food additives of a chemical nature can cause various disorders of the respiratory, nervous and endocrine systems and also cause allergic reactions [1, 2]. Of course, the organs of the digestive system are not an exception since exogenous factors are often the provoking factor of intestinal diseases [3]. Therefore, in our opinion, establishing the morpho-functional changes of the small intestine, particularly the ileum, which appears as a result of food additives, requires further research.

Aim of the study.

To evaluate the morphological structure of the wall of rats' ileum in the early stages of using food additives complex.

Main part.

The study was conducted on 20 white sexually mature rats weighing (180-202) grams, which were divided into control and experimental groups. The animals of the control group were administered a physiological solution, and the animals of the experimental group were administered a complex of food additives at the rate of 20 mg/kg monosodium glutamate, 5 mg/kg Ponceau 4R and 0.6 mg/kg sodium nitrite in 0.5 ml of distilled water orally for seven days. The food additives taken were two times lower than the maximum permissible doses for food products. The experimental animals were withdrawn from the experiment by overdose with ether anaesthesia. Biopsies of the ileum were removed and embedded in paraffin according to standard techniques. Further, histological and morphological research was carried out. Sections made from paraffin blocks were stained with hematoxylin and eosin, with a further study using a light microscope with a digital photomicroscope from Olympus C 3040-ADU with programs adapted for these types of research (Olympus DP – Soft, license no.

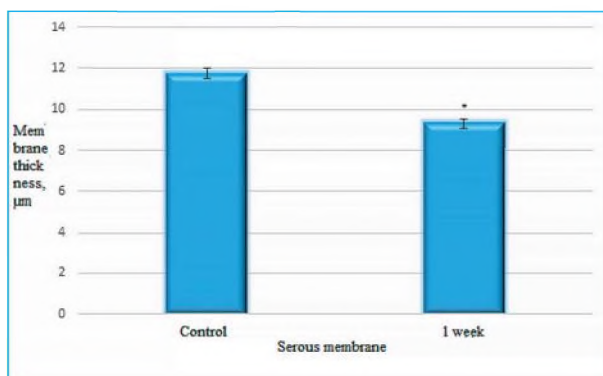


Figure 1 – Indicators of the average thickness of the serous membrane of rats in the control and experimental groups.

Note: * – $p < 0.05$ compared to the control group.

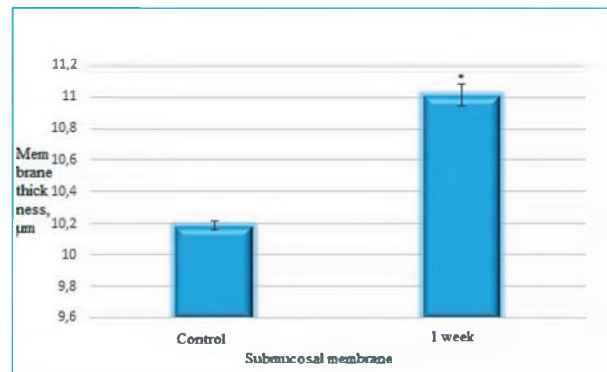


Figure 3 – Indicators of the average thickness of the submucosa of rats in the control and experimental groups.

Note: * – $p < 0.05$ compared to the control group

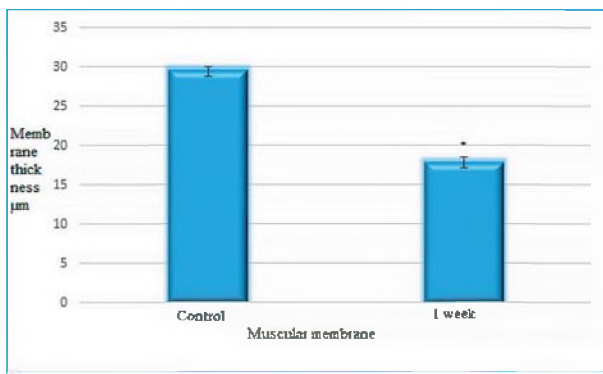


Figure 2 – Indicators of the average thickness of the muscle membrane of rats in the control and experimental groups.

Note: * – $p < 0.05$ compared to the control group.

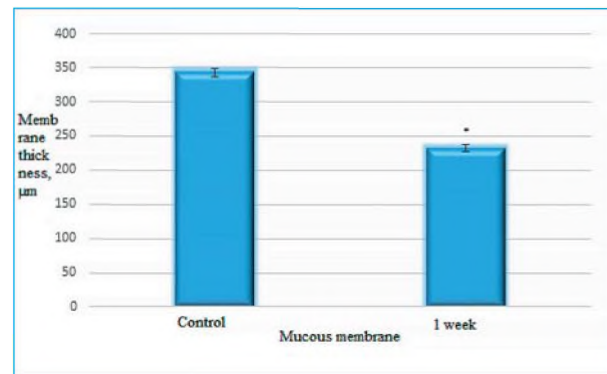


Figure 4 – Indicators of the average thickness of the mucous membrane of rats in the control and experimental groups.

Note: * – $p < 0.05$ compared to the control group.

VJ285302, VT310403, 1AV4U13B26802) and Viorex 3 (serial number 5604).

The obtained results were analysed on a computer using the «InStat» application program package. The difference was considered probable at values of $p < 0.05$.

It was established that the wall of the ileum consists of serous, muscular, submucosa and mucous membranes.

The wall's structure of the experimental group of rats corresponded to the control group. The indicators of the thickness of the serous membrane were 25.8% less than in control ($p < 0.05$) (fig. 1). It can be explained, in our opinion, by the destruction of mesothelial cells due to the action of a complex of food additives.

The most significant changes were found in the ileum muscle layer of rats of the experimental group, where the indicators were 64.8% lower compared to the control (fig. 2), which is most likely caused by the

compression of the thickened layer of the submucosa on one side and serous membrane on the other.

As for the submucosa, it was established that its average thickness in the animals of the experimental group was 7.36% more than in control (fig. 3), which, in our opinion, can be explained by hyperhydration of loose connective tissue and leukocyte infiltration.

The mucous membrane of the ileum of rats in the experimental group was characterized by a decrease in its thickness by 47.7% compared to the control (fig. 4) due to a reduction in the height of the intestinal villi due to the destruction of the cells of the epithelial layer, in particular, epitheliocytes, goblet-shaped exocrinocytes, and endocrinocytes.

Conclusions.

Thus, the obtained data make it possible to establish the presence of structural and metric changes in the wall of the ileum of rats, which appear already from the first week of using a complex of food additives.

References

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