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MORPHOMETRIC CHANGES IN THE WALL THICKNESS OF MEDULLAS ARTERIOLES OF THE RATS ADRENAL GLANDS AFTER THE INFLUENCE OF A FOOD ADDITIVE COMPLEX

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Introduction.

Taste plays an essential role in human life. Taste is not only a protective mechanism we recognize the suitability of products for consumption but also a way to get positive emotions from delicious food. Every day, a person consumes food products that contain food additives [1-3].

Food additives are a group of natural or synthetic substances added to food raw materials, finished products and semi-finished products to give them specific taste properties, a good appearance and increase the duration of storage.

The most common additives we study are monosodium glutamate (E621), sodium nitrite (E250) and Ponceau 4R (E124). Unfortunately, these additives harm human health and cause serious diseases.

Particular attention should be paid to the effect of these supplements on the adrenal glands, as they can cause disruption of their function and cause oncological diseases.

Aim of the study.

To determine the morphometric changes in the wall thickness of the arterioles of the medulla of the adrenal glands of rats under the influence of a food additive complex.

Main part.

An experimental study was conducted on 80 rats. The control group of rats consumed drinking water and saline orally. Rats from the experimental group were given to drink a 10% solution of sodium nitrite (E 250); monosodium glutamate (E621) was administered at a dose of 20 mg/kg in 0.5 ml of distilled water; Ponceau 4R – at a dose of 5 mg/kg in 0.5 ml of distilled water once a day orally. Dosages of food additives were two times lower than the permissible norm in food products. After 1, 4, 8, 12 and 16 weeks, rats were removed from the experiment by decapitation under ether anesthesia. Then, the fragments fixed in formalin were sealed in paraffin. Subsequently, the sections stained with hematoxylin and eosin were examined using a Biorex light microscope with a DSM 900 digital photomicroscope. In order to obtain semi-thin sections, the studied material was fixed in glutaraldehyde and sealed in EPON-812. Ready sections were stained with toluidine blue. The morphometric method determined the wall thickness of the medulla adrenal glands' arteriolas. Data processing was carried out using the Excel program.

During the morphometric study, it was found that the hemomicrocirculatory channel (HMCB) of the adrenal glands of rats is well-developed and multi-component. After modelling the experimental effect of food additives, we discovered the regular reactions of the vessels of the medulla and their structural rearrangement.

During the morphometric study of the average total wall thickness of arterioles of the medulla of the control group, it was established that the average total wall thickness of arterioles was (1.54±0.01) μm. After animals use food additives, morphometric indicators change significantly. After the 1st week, the indicator was (1.51±0.03) μm, 1.95% less than the control value. In the 4th week, this indicator was (1.58±0.04) μm, 2.59% more than the control value. After the 8th week, the indicator was (1.52±0.05) μm – 1.29% less than the control. On the 12th and 16th weeks, the average of the arteriole's total wall thickness changed significantly and amounted to (1.68±0.06) μm and (1.72±0.07) μm, which is by 9.09% and 11.68% higher than the control, respectively.

Conclusions.

Under the influence of a food additive complex on the indicators of the average total wall thickness of arterioles of the medulla of the rat's adrenal glands, a spasm was observed in the initial stages of the study, caused by the altering effect of food additives and an increase in the thickness of the arteriole wall, which indicates a violation of hemodynamic conditions. In the later stages of the experiment, the development of inflammatory reactions and hypoxia was observed, which led to the activation of compensatory-restorative mechanisms, but complete recovery did not occur.

References

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