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EXOGENOUS MELATONIN INFLUENCE ON CYTOMETRIC INDICES OF THE SUPRAOPTICAL NUCLEI IN THE STRESSED RATS' HYPOTHALAMUS

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The hypothalamus is the highest coordinating center of the neuroendocrine system, whose nerve cells are combined in multiple nuclei with various links between themselves and the structures of the CNS, and also possessing secretory activity (these are mainly front and medial areas), carrying out regulatory functions necessary to maintain homeostasis. However, the issues, concerning the correction of the influence of stressors on supraoptical nuclei (SON) in the hypothalamus in case of a changed photoperiod have not been sufficiently studied.

Our study objective was to find out exogenous melatonin influence on changes in cytometric indices of hypothalamus SON under 24 hour illumination.

Experimental animals (mature nonlinear male white rats) were divided into four groups and in each of them biomaterial sampling was performed at 2 PM and 2 AM on the eighth day of the experiment. Fixed with neutrally buffered 10% formalin solution and later coloured with hematoxylin and eosin, microscopic sections 5mcm thick were studied in the programming environment of GIMP 2.8. The terms of the experiment were conditioned by different functional activity of the pineal gland and by the production of a leading chronobiotic - melatonin (MT) in the indicated time periods. The animal groups which underwent 24 hour illumination were injected with exogenous MT for correction. The intact animals underwent a standard photoperiod (12.00L:12.00D).

In the group of animals which were administered exogenous MT and exposed to light stress (+24.00L: 00D) a reduction in such indices as the volume of the neurocyte nucleus (at 02.00 AM - 198 ± 1,3; 02.00 PM - 197 ± 1 2), neurocyte volume (at 02.00 AM- 1114 ± 10,8; 02.00 PM - 1099 ± 10,4), a standard deviation of the neurocyte nucleus coloring (at 02.00 AM - 9,1 ± 0,18; 02.00 PM - 8,8 ± 0,14), increasing in the nuclear-cytoplasmic ratio (at 02.00 AM - 0,178 ± 0,0024; 02.00 PM - 0,179 ± 0,0023) and of the optical density of staining nuclei neurocyte nucleus staining (at 02.00 h - 0,289 ± 0.0028, 14.00 h - 0,296 ± 0,0027) compared to intact group.

These cytometric parameters are much higher than those in the groups, which were not injected with MT, but they still do not reach the indices of intact animals.