THE EFFECT OF THE MELATONIN-CONTAINING PREPARATION ON THE HISTOLOGICAL STRUCTURE OF THE ORGANS OF THE IMMUNE SYSTEM OF MICE UNDER ROUND-THE-CLOCK ILLUMINATION

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INTRODUCTION

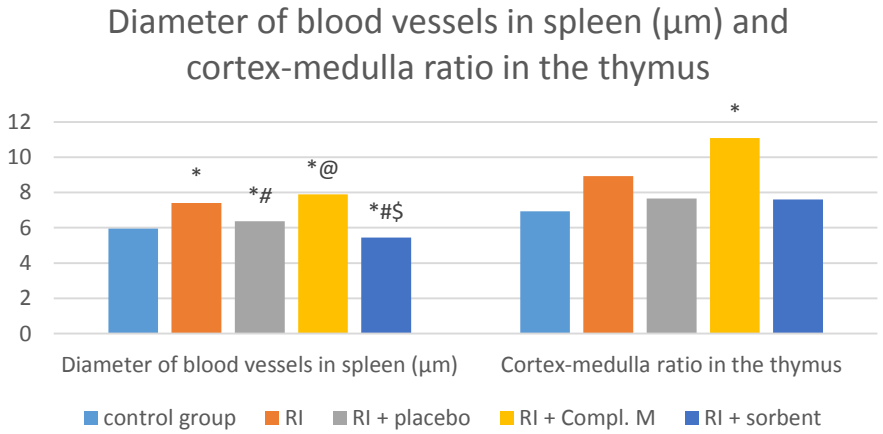
- In modern time person's everyday life, the light regime is often disrupted. It entails a decrease in the synthesis of melatonin in the dark and increases the incidence of cancer, the occurrence of psychoemotional disorders, leads to accelerated ageing, impaired immunity, etc. [1, 4]. Melatonin influences the differentiation of lymphocytes, the activity of inflammation, and the strength of the immune response [2]. Consequently, it is important to study the influence disruption of the light regime on the organs of the immune system and the possibility of correction of immune disorders by means of new melatonin-containing preparation (Complex M) synthesized in the laboratory of pharmaceutical technologies in RICEL - Branch of IC&G SB RAS [3]. Study's purpose is the identification of histological features of the thymus and spleen of mice by means of oral administration of a new melatonin-containing preparation (Complex M) in conditions of light regime's disruption under round-the-clock illumination.

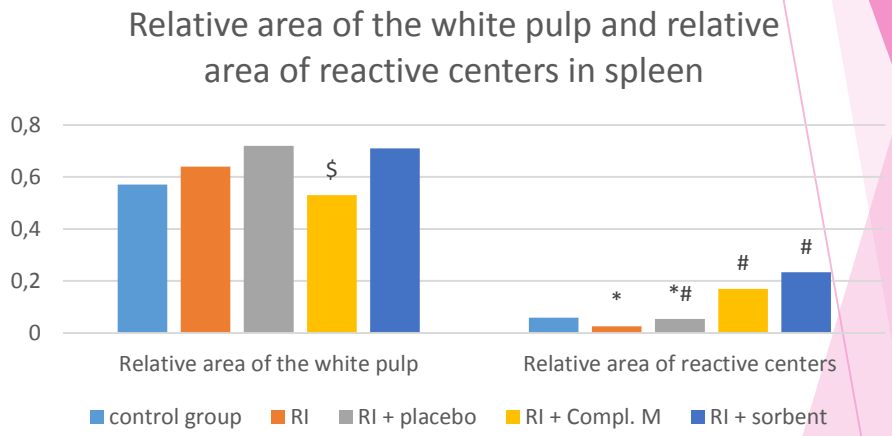
MATERIALS AND METHODS

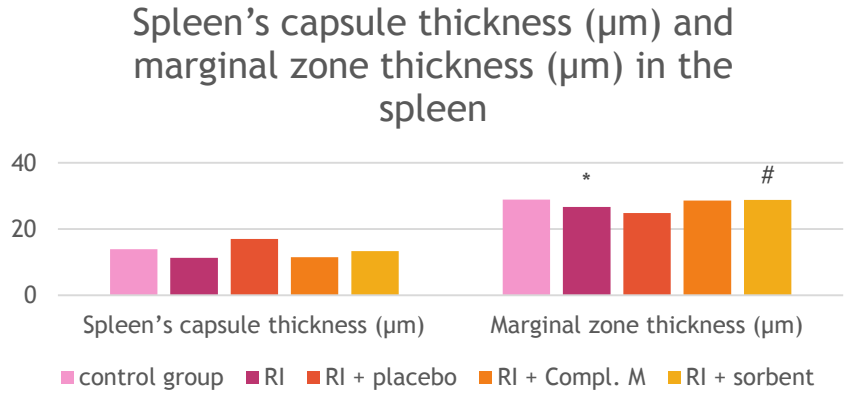
- In the experiment, we used mice with SPF status (inbred strain C57Bl / 6J), males, aged 10-12 weeks. Formed five groups: mice that were kept in normal light conditions (control group), intact mice that were kept under round-the-clock illumination (RI), mice which were kept under round-the-clock illumination and was orally administered distilled water (RI + placebo) by gavage; mice that were kept under round-the-clock illumination and was orally administered the solution of Complex M (RI + Complex M) by gavage, mice which were kept in round-the-clock and was orally administered the solution of the sorbent (RI + sorbent). Complex M consists of an active substance, that is melatonin, and carrier-sorbent, that is polydimethylsiloxane. Then, some mice were kept under 24-hour lighting for 14 days. In the experiment, spleen and thymus samples were fixed in neutral formalin. Paraffin sections were prepared with hematoxylin-eosin stained. Morphometric studies were performed using Image-Pro Plus (Media Cybernetics, USA) and Image J (National Institutes of Health, USA).

Results

- It was shown that the introduction of Complex M reduces the relative size of spleen's white pulp, possibly due to the expansion of the sinuses. The use of the preparation increases the size of the reactive centres, the marginal zone of the spleen follicles and venous sinuses of the organ. This may be a sign of activation of immune functions and increased venous blood flow. In addition, the introduction of Complex M increases the cortical brain index of the thymus, which may indicate stimulation of the central differentiation of T-lymphocytes.







Note: RI – round the clock illumination; * - the value is significantly different from the control group, # - from group RI, $ - from group RI + placebo, @ - from group RI + sorbent ($p < 0.05$, Mann-Whitney U-test)

CONCLUSION

- The effects of Complex M can be a consequence of the combined action of the drug components (melatonin and sorbent) and indicate the activation of the central and peripheral organs of the immune system.

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