

Effect of aluminum oxide and polydimethylsiloxane on thymus cellular composition in mice kept under 24-hour lighting

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Lighting at night is considered as "light pollution" that disrupts the circadian regulation of melatonin synthesis, violates metabolism and other hormone-controlled systems, and also increases the risk of developing cancer. Currently, a sorbent matrix created on the basis of aluminum oxide and polydimethylsiloxane is actively used as a carrier of biologically active molecules of melatonin, lithium, etc. The study aim was to investigate the sorbent effect on the thymus T-cell composition in C57Bl/6j mice kept under 24-hour illumination for 14 days. Experiments included groups: "CL" – continuous lighting (24/0 h); "Control" – animals under a standard light regime (14/10 h); "CL+Sorbent" – mice under CL with administration of an aqueous (200 µl) sorbent suspension 0.664 g/kg body weight. Thymocytes CD3^{low} and CD3^{hi} were determined by flow cytometry. The Mann-Whitney criterion ("Statistica12") was used for statistical analysis. The median, first and third quartiles were determined. The differences were considered statistically significant at $p < 0.05$. Prolonged CL, reducing the thymocyte proliferation and activating apoptosis, led to a decrease in the percentage of CD3^{low} and CD3^{hi} thymocytes compared with the control. Sorbent treatment increased the relative number of young CD3^{low} T-cells to 47.0 % [46.08; 47.25] compared with the "CL" group (38.7 % [35.35; 39.5]). The content of mature CD3^{hi} thymocytes after sorbent administration did not differ from the "CL" group. The CD3^{low}/CD3^{hi} ratio of thymocytes significantly exceeded the "CL" group and reached the control level. So, the inhibitory effect of CL on the mice thymus is partially compensated by the sorbent introduction that protects young and sensitive to apoptotic factors CD3^{low} T-lymphocytes from death and supports their proliferation.

Acknowledgements: This study was supported by the budget project of the Research Institute of Clinical and Experimental Lymphology – Branch of the ICG SB RAS (FWNR-2022-0009).