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Cellular interaction in central and peripheral immune organs due to chronic light stress

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Aim: Study cellular interaction in central and peripheral immune organs at prolonged all-day illumination in an experiment on rabbits.

Introduction: Prolonged all-day illumination is considered nowadays as one of the stress-factors for the living organism and causes malfunctions of the neuroendocrine system and may initial immune dysfunction.

Methods: Experimental rabbits (n = 10) were in artificial lighting in the day and electric lighting at night during 12 months. Control animals (n = 5) were kept in natural day and night lighting conditions. Cell density in immune organs (thymus, bone marrow, spleen) were measured in surface area which was determined by a rectangle $100 \times 100 \mu m$. The results were processed with standard statistical methods and reported as mean $\pm$ standard deviation (SD).

Results: The cell density in the thymus and the bone marrow was decreased: in the cortex of the thymus was $359.6 \pm 2.9$ (cells $100 \times 100 \mu m$). An intensified formation of the connective tissue, an increasing of involutive processes and degenerative changes of lymphocytes were microscopically found in the spleen and the thymus. The cell density in the spleen was decreased too: in T zone – $235.8 \pm 3.7$, in B-zone – $159.5 \pm 1.9$ (cells in $100 \mu m \times 100 \mu m$). The causes of these changes, probably, may be decrease of the differentiation and migration of lymphocytes as result negative influence of the prolonged light on central immune organs.

Conclusion: These changes in organs of the immune system indicate both a premature aging of the spleen and the thymus and probably of all the immune system. Significant reduction in cell density in the immune organs associate with negative effects of the chronic light stress and leads to expressed immune dysfunction.

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Intermittent low-level lead exposure causes anxiety and cardiorespiratory impairment

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Aim: Intermittent low-level lead exposure has been reported to influence anxiety and cardiorespiratory impairment.

Introduction: The most common symptoms of lead intoxication are cognitive abnormalities, motor behavior, anxiety, irritability, and sleep disturbances. In addition, lead exposure is associated with altered cardiorespiratory function, including changes in heart rate variability.

Methods: A total of 50 healthy subjects were randomly assigned to one of the following groups: lead exposure (n = 25) and a control group (n = 25). The lead exposure group was exposed to intermittent low-level lead exposure for 12 months, while the control group remained unexposed. Cardiorespiratory parameters were measured using a respiratory inductive plethysmograph (Respitrace) and a heart rate variability (HRV) monitor.

Results: The frequency of anxiety symptoms was significantly higher in the lead exposure group compared to the control group (p < 0.05). In addition, the lead exposure group showed decreased heart rate variability (HRV) compared to the control group (p < 0.05).

Conclusion: Intermittent low-level lead exposure causes anxiety and cardiorespiratory impairment.