

Effect of Different Photoperiod Length on the Structural Organization of Anterior HypothalamusSuprachiasmatic Nuclei

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INTRODUCTION: Light condition violation causes disbalance in melatonin synthesis and development of desynchronization. Contradictory data, concerning the effect of different photoperiod length on the chromomorphologic and ultrastructural condition of hypothalamussuprachiasmatic nuclei (HSN), closely related to organisation and realization of circadian rhythms, have been found in the available resources. **AIM:** The aim of this research was to study transformations in neurosecretory cells of HSN of rats under different photoperiod length. **MATERIALS AND METHODS:** Experiments were conducted on sexually mature white male rats. The animals had been divided into 5 groups which were exposed to different photoperiod length. The areas of HSN were studied lightoptically and by means of electron microscopy. **RESULTS:** According to the study, the structural organization of neurosecretory cells in HSN in white rats under standard light conditions shows increase in neuron functional activity at 2PM ant its decrease at 2AM. Light deprivation lowers the activity of circadian pacemaker during 24 hours which is evidenced by light optical and ultrastructural changes in the neuroplasm and organelles of the structures under the study. At 2PM, under light deprivation, there were dark neurosecretory cells which are characterized by pyknotically modified nuclei containing osmiophilic karyoplasm, invaginations of karyolemma. Their electronically dense neuroplasm contains destructively changed organelles. Light stress causes significant desynchronization of the circadian pacemaker and its activity depression. Under continuous light exposure the destructive changes in the components of the structures which are studied will be more pronounced at 2AM. The karyolemma contains very few ribosomal granules and few nucleoli. Neuroplasm has heightened electron density; the membrane organelles have fuzzy contours. This condition indicates the decrease in functional activity of the structures with some destructive elements. **CONCLUSION:** Further research will allow to learn deeper mechanisms of circadian rhythms in mammals' brains as well as the role of hypothalamus suprachiasmatic nuclei in providing circadian periodicity.

KEYWORDS: hypothalamus, suprachiasmatic nuclei, photoperiod, desynchronization

Massive Allograft Reconstruction after Resection of Tumours of Long Bones

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INTRODUCTION: Bone tumours located in the diaphysis are rare. After bone tumour resection, reconstruction of bone can be performed with foreign material (endoprosthesis) or with bone graft. **AIM:** The aim of this study was to analyze the results of massive bone allografts as a reconstructive option use after en bloc resection of the tumours in long bones. **MATERIALS AND METHODS:** In this study we included all patients treated in the Department of Orthopaedic Surgery, Clinical Hospital Centre Zagreb, between 1999 and 2012. In total, we found 23 patients in whom femur (n=14), humerus (n=5), and tibia (n=4) were reconstructed with bone allograft. **RESULTS:** Functional status did not improve after the operation comparing to preoperational results. Host bone - allograft junction union occurred after average 4 months (range 2 to 12 months), whilst the complete union occurred after 12 months. Complications were registered in 56% of patients. **DISCUSSION:** Oncological complication - local recurrence, had a direct influence on survival. Patients with nononcological complications: mechanical complications of osteosynthesis, infection and nonunion, were candidates for additional surgical procedure. In total, we performed 48 surgical procedures in our cohort. No significant correlation between results of treatment and other individual patients' characteristics was found. **CONCLUSION:** Reconstruction with massive bone allografts has a higher rate of mechanical complications comparing to reconstruction with endoprostheses, but is a superior method due to significantly better long-term survival.

KEYWORDS: massive bone allograft, tumorendoprosthesis, complication, survival