Abstract

Long-term exposure to constant light results in desynchronization of the circadian system in an adult and is associated with reduced efficiency of many physiological functions timed to the exact time of day, or with the development of some of the so-called civilization diseases. Constant light in adults also results in deterioration of the cognitive abilities or changes in the sleep structure. The effect of night light on the health of an adult organism is studied mainly in connection with shift work or with light pollution. The question of what effect the increased level of night light has on the development of the organism, especially on the development of the nervous system and the circadian system itself, is less studied.

This diploma thesis focused on the identification of the extent of changes in the expression of *Per2, Nr1d1, Stat3, BDNF* genes, as well as genes encoding NMDA receptor subunits and some tissue-specific genes in the retina. Our experiments were performed on adult Long-Evans rats, that spent the first 20 days of their postnatal development in low-intensity constant light. Changes in expression were determined by quantification of mRNA by RT-qPCR in the structures of the frontal and parietal cortex, olfactory bulb, hippocampus, suprachiasmatic nucleus and retina. Behavioral tests were used to assess the degree of anxiety in these animals. Our results confirmed the development of anxiety behavior and changes in the expression of several tested genes in animals, that grown up in a constant light.

Keywords: circadian clock, synchronization to light, development, suprachiasmatic nucleus