

Abstract

Circadian system of mammals is generated in suprachiasmatic nuclei of hypothalamus. This system is synchronized with light conditions through phase shifts that occur after light exposition during the subjective night. Recent studies have shown that activation of endocannabinoid receptors attenuates the light-induced phase shifts and influences the ability of circadian system to light entrainment. The aim of this work is to examine this influence on behavioral level and on light-reactive cellular processes within the suprachiasmatic nuclei. Our results show that the activation of endocannabinoid system via CB1 receptor agonist modulates the light-induced phosphorylation of extracellular signal-regulated kinase 1/2 (ERK1/2) and the expression of c-Fos protein in neurons of suprachiasmatic nuclei in the rat's brain; these cellular processes correlate with the attenuation of light entrainment.

Keywords: circadian system, suprachiasmatic nuclei, light entrainment, endocannabinoid system, CB1 receptors, extracellular signal-regulated kinase 1/2, ERK1/2, c-Fos