

The Effect of Light Factor on the Expression of Melatonin Receptors (MT1 and MT2) in the Rat Pineal Gland During Early Stages of Postnatal Development

Tsira Rostiashvili, Avtandil Asanidze

Email: tsira.rostiashvili647@ens.tsu.edu.ge

Department of Biology, Faculty of Exact and Natural Sciences, Ivane Javakhishvili Tbilisi State University, Georgia,
Tbilisi, University Street No. 13

The determination of rhythmic changes in vital processes occurring in the organism and the patterns of their synchronization remains an urgent problem in biology to this day. It has been established that the light plays a decisive role in the synchronization of vital processes. Specifically, it has been shown that process of synchronization is achieved from the 3rd day (17th day from birth) after eye opening. The regulation of many functions of the organism is achieved, as is known, through biologically active compounds produced by the pineal gland, including the neuropeptide melatonin. In adult organisms, melatonin concentration is in turn linked to the regulation of MT1 and MT2 receptor expression. In mammals, the MT2 receptor, as is known, is involved in circadian rhythms and responds to day-night changes. Moreover, their quantity in different brain regions, as is known, varies and changes throughout the day-night cycle.

Based on the above, the aim of the presented study was the comparative investigation of the peculiarities of melatonin receptor (MT1 and MT2) expression in the cerebellum of juvenile rats before and after eye opening. The concentration of melatonin (MT1 and MT2) receptors in the cerebellum of 8-day-old and 22-day-old juvenile rats was determined using the ELISA method.

during the early stages of postnatal development (22nd day), the expression patterns of melatonin MT1 and MT2 receptors in the cerebellum of juvenile rats during nighttime are influenced by light exposure. Furthermore, the increase in MT2 receptor expression in the cerebellum of juvenile rats during both day and night hours after eye-opening confirms that this receptor is directly involved in the formation of circadian rhythms.

References:

Light factor and rhythms of biological processes in the postembryonic period of development of white rats. Communications of the Academy of Sciences of the Republic of Georgia, 1992, vol. 145, No. 1, pp. 153-155 (Co-authors: Tavdishvili E.Yu., Dzidziguri D.V., Kakhidze I.G., Tumanishvili G.D.).

Activation of MT2 melatonin receptors in rat suprachiasmatic nucleus phase advances the circadian clock. Amanda E. Hunt et al.; 01 Jan 2001 <https://doi.org/10.1152/ajpcell.2001.280.1.C110>