

## **Abstract**

In human population, there are individual differences in the length of endogenous period which is generated by transcriptional-translational loops of clock genes in the suprachiasmatic nucleus of the hypothalamus (SCN). On the basis of these differences we divide people into the early, late or neither chronotype. Chronotypes differ from each other mainly in the rhythm of the hormone melatonin, which is used as a marker of endogenous period. They also differ in rhythm of locomotor activity. The aim of this study was to describe a difference in the phase of the circadian system in three pairs of monozygotic twins aged 8-10 years who live together and share the same daily routine. To describe these differences, we used a questionnaire CCTQ, melatonin radioimmunoassay and actigraphy. According to the questionnaire, one boy was determined as early chronotype (A3), one girl was determined as late chronotype (B3) and the other children were determined as neither chronotype (A2, B2, C2, C3). Among the twins there were marked differences both in the rhythm of melatonin and in the morning activity. These differences confirmed the chronotype assessed by questionnaire in the boy A3 and the girl B3. On the contrary, differences in melatonin rhythm did not confirm neither chronotype in siblings C2 and C3, and show that these siblings have different chronotype. Our results suggest that children with later chronotype are more influenced by social jet lag than children with morning chronotype. We found that for the description of circadian rhythms only the morning actigraphy record is reliable. Our results clearly showed that monozygotic twins living in the same environment and under the same regime show differences in physiological and behavioral characteristics associated with different chronotype.

**Keywords:** chronotype, monozygotic twins, melatonin, actigraphy