

## **Abstract**

One of the few attributes common to almost all living organisms is an ability to generate and maintain endogenous rhythms, which are controlled by a biological clock. The processes, which recur with a period of about 24 hours, are known as the circadian rhythms. The circadian clock controls rhythms of molecular, physiological as well as behavioral processes and adapts their activity to regularly appearing changes in day and night or season. In case of mammals, central oscillator is located in the hypothalamic suprachiasmatic nuclei (SCN). The SCN clock entrains rhythms of peripheral oscillators located in cells of other tissues. The central oscillator itself is synchronized with external environment mainly by a light-dark cycle, however, other cues can entrain the SCN clock as well. For example, during prenatal development, entrainment of a fetal clock is entirely dependent on non-photic cues derived from maternal organism. This study aimed to investigate a mechanism of the communication between the maternal and fetal central oscillators. A hypothesis was tested whether maternal melatonin may play a role in entrainment of the circadian clock in the fetal SCN. Furthermore, a mechanism, how melatonin may entrain the fetal clock was investigated at molecular level. The results provided evidence, that maternal melatonin may entrain the fetal SCN presumably due to a direct effect on the clock gene expression in the fetal SCN.