

The mammalian biological clock is based on endogenous rhythmic oscillations of the so-called clock genes which affects the timing of the external manifestations, such as rhythmic alternations of sleep and activity. This endogenous mechanism, of which the innate period slightly deviates from the solar time, can be adjusted by various external synchronizers to the exact 24 hour period. This thesis is focused on the influence of the most prominent synchronizer, the sunlight, on the molecular basis of changes in the dynamics of internal mechanism of the oscillations in the main mammalian circadian pacemaker, the suprachiasmatic nuclei of the hypothalamus. There are numerous studies which have demonstrated the effect of various cellular signaling pathways on changes of circadian rhythms. The most common methods of assessing the oscillation phase changes, however, measure changes in output rhythms that may not always reflect the changes in the molecular mechanism itself. The aim is to evaluate which components of signaling pathways have provably shown to affect the dynamics of the rhythmic expression of clock genes.