ABSTRACT

Suprachiasmatic nuclei are the main oscillator of circadian rhythms. Using clock genes and their protein products (forming transcription-translation feedback loops), suprachiasmatic nuclei play an important role in the control of many physiological functions. Bioluminescence (the amount of hourly protein PER2) was measured by a method using transgenic organisms. In this work, cycloheximide was used to inhibit proteosynthesis and to subsequently monitor the degradation of PER2 in real time. The protein was then measured in explants of suprachiasmatic nuclei of adult mice, in suprachiasmatic nuclei of fetuses and in placentas. Furthermore, the effects of glycogen synthasykinase 3β inhibitors on the dynamics of PER2 protein degradation were compared. A selective inhibitor CHIR-99021 and a non-specific inhibitor lithium chloride were used. The experiment shows that the CHIR inhibitor slows down protein degradation in all tissues used. In contrast, the effect of a non-specific lithium chloride inhibitor has not been clearly demonstrated. In fetal nuclei, its effect on the dynamics of degradation was slowing, while in adult nuclei, degradation was significantly accelerated. No significant results were observed in placental explants. Research focusing on the influence of these clock genes, respectively their proteins could be used for therapeutic targeting in the future.

Key words:

clock protein PER2, protein degradation, proteosynthesis inhibition, cycloheximide, bioluminescence