Abstract

The circadian system influences almost all physiological processes in the mammalian body. Among other things, detoxication processes in the liver are under circadian control. Both central and peripheral clock in the liver regulate the expression of genes involved in the detoxication of xenobiotic substances and drugs. The first part of this thesis summarizes the main characteristics of the central and peripheral circadian clocks, including their molecular basis. The second part focuses on the main functions of liver tissue with a focus on detoxification processes. The emphasis of the third section is on circadian rhythms in the expression and activity of enzymes called cytochromes P450, which are the most important system catalyzing phase I detoxication, and also briefly discusses the influence of the circadian system on the expression of nuclear receptors and PAR bZIP transcription factors involved in the regulation of cytochrome P450 transcription. The last section describes the influence of the circadian system on the efficacy and toxicity of selected drugs, on paracetamol metabolism with the main purpose of describing how paracetamol-induced hepatotoxicity is affected by time of administration.

Key words: circadian system, liver, detoxication, cytochrome, paracetamol