

Abstract

Circadian system consist of the main circadian oscillator and the peripheral oscillators. Their function is to enable the adaptation of living organisms to the diurnal environmental changes. Circadian system regulates rhythmical expression of genes in nearly every cell of the body, thereby affecting both the physiological and behavioural processes of mammals and other animals. This bachelor's thesis summarizes a knowledge from experiments which led to the demonstration of circadian rhythms in cardiovascular system. To introduce the topic, the first discoveries of circadian rhythms in the cardiovascular system are mentioned. Then, we focus on the circadian rhythms in cardiomyocytes, vascular endothelial cells and in vascular smooth muscle cells. Another focal point of my thesis is the role of transcription factor Krüppel-like factor 15. Circadian regulation of the cardiovascular system is important for the proper function of the heart and blood vessels. Circadian disruption can cause severe pathophysiological and cardiovascular conditions, such as ventricular hypertrophy, hypertension, atherosclerosis, myocardial infarction or coronary artery disease.

Key words: circadian, clock genes, cardiovascular system, cardiomyocytes, vascular endothelial cells, vascular smooth muscle cells, Krüppel-like factor 15, cardiovascular diseases