

Depression has become common in modern society, which seriously harms the human health. Globally, an estimated 350 million worldwide and 250 thousand in Poland people of all ages suffer from depression. Depression can lead to suicide – the second leading cause of death in 15-29-years-olds. There are no clinically accepted biomarkers for depression diagnosis and for prediction of individual treatment response. To develop effective predictive markers with significant impact on health and economy in societies we have to know and understand all etiopathological pathways of disease. Disturbed sleep and circadian rhythms is a flagship feature of depression and altered melatonin secretion has been observed in depression. Melatonin, known as hormone of darkness, is secreted by the pineal gland in the brain. It helps regulate other hormones and maintains the body's circadian rhythm and by this mechanism may play antidepressant effect. Although melatonin has been found and widely used since as early as 50 years ago, relationship between melatonin and depression, are still quite unclear. Despite a well-established mechanism of melatonin synthesis in the brain, there is no comprehensive study of this pathway, and its changes in the periphery. Thus confirmation that the metabolism of melatonin in peripheral blood partially reflects disorder in the brain could be a breakthrough in standardization of measurements of the melatonin level, the development of treatment standards, finding new therapeutic targets and elaborating simple non-invasive clinical tests. The present study is a pioneer and comprehensive study investigating the metabolism of melatonin in peripheral blood. The comprehensive investigation of melatonin pathway at the level of genes, their transcripts, methylation pattern and proteins, through all the steps in the synthesis and metabolism of melatonin proposed in this project will allow to deepen understanding of mood disorders and to develop novel mood-stabilizers. At the same time, the measurements of the effects of melatonin will become standardized and effective.