

The purpose of the study is to identify transcription factors involved in a differential transcriptional regulation associated with MMP-9-1562C/T polymorphism and to demonstrate their effect on *MMP-9* promoter activity. The project will be conducted using the human cortical neuronal cell line HCN-2 and the human neuroblastoma SH-SY5Y cells. To implement the project, we exploit many advanced techniques of the molecular and cellular biology. MMP-9-1562C/T polymorphism affects the *MMP-9* promoter activity, and consequently the level of *MMP-9* mRNA expression, as well as the course of many human diseases associated with abnormal MMP-9 gene expression. This effect has been observed in both neurological (e.g. stroke, Alzheimer's disease) and non-neurological diseases (e.g. cardiovascular diseases). A molecular mechanism of this phenomenon has not yet been discovered. A substitution of a single nucleotide in the gene promoters can lead to changes in a transcription factor binding. Discovering the MMP-9-1562C/T polymorphism-dependent *MMP-9* transcriptional regulation will provide us with a better understanding of an occurrence of a differential clinical course of the diseases related to an aberrant *MMP-9* expression and will approach us to a development of new targeted therapies.