The aim of this project is to understand the mechanisms of the development of the thalamus. The thalamus is involved in the processing of sensory information, regulation of consciousness, and producing behavioral response. Alterations in this part of the brain, which can occur due to minor developmental impairments, are observed in patients suffering from mental disorders. For this reason it is important to investigate, how developmental processes in the thalamus are regulated.

Development is associated with changes in gene expression, i.e, in the way how the genetic information is read. Therefore the crucial developmental regulators are proteins called transcription factors. They can turn genes on and off. We have observed that one specific transcription factor is present in thalamic neurons throughout their differentiation, which in mammals can take few weeks or months. We already know that an early deletion of this factor causes misrouting and growth inhibition of neural protrusions. We do not know, what its role is later. We do not know either, which genes are regulated by the factor, but we have data suggesting that these are several group of genes, which are supposed to be turned on in different developmental stages. We also have a hypothesis that explains how the same factor can regulate different genes at different times, but we have no experimental conformation. In this project we would like to answer all these “unknowns”.