

**What is the aim of the project?**

We want to understand the cellular and molecular mechanisms underlying the differentiation of distinct thalamic neuron subtypes. We would like to find out if terminal characteristic of thalamic neurons is determined at the very beginning of the differentiation process, or maybe it can be shaped postnatally, through the incoming neuronal activity. We are also going to test the effect of a selected regulatory protein on differentiation of thalamic neurons. This will be achieved by using mice in which we will disrupt the gene that encodes this protein.

**What is the thalamus?**

One of the basic functions of the brain is to integrate sensory input and information about the location and movements of the body, and plan and execute action accordingly. The key role is played here by the cerebral cortex and the thalamus. The latter filters sensory and motor information to direct attention only to some of them, and communicate sensory, motor, associative and executive areas of the cortex. Translating this into practice, without the thalamus the cortex could not produce a perception of the world and appropriate behavior.

**What might be the consequences of altered development of the thalamus?**

Impaired functioning of the thalamo-cortical system is considered to be one of the causes of some mental conditions, schizophrenia in particular, and certain types of epilepsy.

**Why we proposed this research?**

The thalamus has remained in the shadow of the cerebral cortex, which attracts much attention as an evolutionarily new structure, particularly well developed in humans and associated with so called "higher-order functions". However, in fact the evolution of the cortex and the thalamus is closely linked, and much evidence points to the thalamus, not the cortex, as a location of consciousness. The primary reason why we get interested in the development of the thalamus is simply the lack of knowledge on how this undergoes and is controlled, and a belief that by knowing more about the thalamus we will better understand ourselves. Considering the possible involvement of impaired thalamo-cortical developmental in pathogenesis of psychiatric and epileptic condition, the results of our research will provide useful information for research on the causes of these diseases and a possible prevention strategy.