

Mental disorders are currently very serious and widespread problem of European citizens. It is estimated that this problem affects 34% of the Europeans. The most common mental diseases include: anxiety disorders (14% of the population), mood disorders (8% of the population) and psychotic disorders (e.g. schizophrenia, 1%–2% of the population). The treatment of mental diseases is still related to huge financial expenditures, and is a major economic and social concern. This is due to the fact that cellular mechanisms conditioning these diseases occurrence are not fully recognized, and therefore it is not possible to implement an effective treatment. The precise understanding of these mechanisms will allow implementing an effective therapy.

Numerous experimental data indicate that the development of mental diseases is affected by abnormal activity of cerebral cortex neurons. An activity of nerve cells depends, *inter alia*, on the presence and functioning of protein structures present in the cell membrane of neurons. These structures are called membrane ion channels. One of them are Nav1.9 type ion channels. It is proven that abnormal activity of Nav1.9 channel may be observed in the diseases such as schizophrenia, epilepsy and senile dementia. Unfortunately, the kinetic properties of these channels are not fully understood. Therefore, the aim of this project is recognition and more accurate understanding of the mechanisms of membrane ion channels of Nav1.9 type functioning in different stages of ontogeny. This may contribute to the introduction of therapy and rational drug design aimed to improve and correct impaired nerve cells activity.

An effective treatment of mental disorders is one of the most important challenges of modern medicine.