

DESCRIPTION FOR THE GENERAL PUBLIC

At the base of numerous psychiatric and neurological diseases, such as depression, schizophrenia, Parkinson's disease and addiction, is the incorrect functioning of the dopamine system of our brains. These disorders are most likely due to defects in the functioning of the brain structures innervating and controlling the activity of our dopaminergic neurons. In particular, the role of the dopamine system seems to be crucial in the formation of pathological reactions of humans and animals to stress and strong, unpleasant stimuli. Neurobiological mechanisms that mediate the response of dopaminergic neurons to stress are still not well understood.

The project will describe a new, hitherto unknown source of innervation controlling the activity of dopaminergic neurons, located in the brainstem of the mammalian brain - precisely in the nucleus called the nucleus incertus. During research conducted on laboratory rats, the anatomy of this neuronal connection will be described and its effect on the electrical activity of dopamine cells will be determined. Thanks to optogenetics, a modern research technique that allows the use of light to control the activity of neurons, it will be checked how the behaviour of animals will change when a newly discovered neuronal tract is activated or deactivated.

The results of the preliminary research allow us to hope that in the future the knowledge gained through the experiments will be used to better understand the mechanisms of the emergence of psychiatric disorders caused by stress, which are more and more common in the societies of developed countries.