

Early life stress is known to impair the structure and function of many areas in the central nervous system in adulthood in both humans and experimental animals. It results in severe psychophysiological disorders, including compulsive behaviours, such as compulsive food intake or addictions. Details of the neuronal mechanisms underlying these conditions have not been fully described yet.

A growing body of evidence suggests that compulsive behaviours are regulated by a small brainstem structure called nucleus incertus. Latest experimental data indicate that there is a strong connection between stress accompanying adverse experiences in early life, as a factor predisposing to compulsive behaviours, and the nucleus incertus system. The goal of the current project is to gain new knowledge in the topic of the influence of early postnatal stress on two related parameters: the physiology and morphology of nucleus incertus neurons and their reactivity to stress in adulthood.

Experiments planned in this project will be based on a rodent model of early life stress, maternal separation stress. For the first two weeks of their life, rat pups will be subjected to maternal separation on a daily basis.

Results of the planned experiments will fill the gaps in current knowledge concerning the influence of maternal separation stress on the electrophysiology and structure of nucleus incertus neurons. These features represent the possible neuronal correlates of compulsive behaviours, caused by impairments in the postnatal development of the central nervous system, as a result of adverse experiences in early life. Data that will be gathered, will become a good basis for future research in this topic and may lead to developing new, better pharmacological treatments for patients with the history of adverse experiences in their childhood, suffering from addictions and other compulsive behaviours.