

DESCRIPTION FOR THE GENERAL PUBLIC

The aim of the project is to investigate the central interaction between the apelinergic and vasopressinergic systems and its role in the regulation of the cardiovascular system.

In recent years despite progress in medical knowledge and technical innovations there is still an increase in the number of people suffering from hypertension, ischemic disease and heart failure. Hitherto, the pathogenesis of many cardiovascular diseases is not fully understood. Recent literature seems to confirm the presence of the interaction between the vasopressinergic and apelinergic systems in central regulation of cardiovascular system. However, the mechanisms underlying this phenomenon were not investigated.

Apelin (AP) is one of adipokines produced by adipose tissue as well as in the brain, heart, kidney and vessels. Protein and mRNA for preproapelin were detected in the hypothalamic nuclei which are also the main source of vasopressin. Vasopressin (AVP) is known as a central pressive hormone. It seems that these systems interact at the level of neuronal nuclei of the hypothalamus. This suggests the involvement of apelin in regulation of vasopressinergic neuronal activities.

Experiments will be performed on 12-week old Sprague-Dawley male rats in two stages.

- In **Stage I** animals will be implanted with intraventricular cannula and arterial catheter for haemodynamic measurements. There will be measured the influence of central infusion of AVP or AP after administration of AP antagonist or AVP receptor antagonist, respectively, on changes in haemodynamic parameters.
- In **Stage II** tissues for molecular biology studies will be collected from all animals from Stage I. After that there will be determining of mRNA expression (Real Time PCR) and protein level (Western Blot) of AP and AVP receptors in the brain (hypothalamus and medulla oblongata).

The explanation of the interaction between apelinergic and vasopressinergic system in the regulation haemodynamic parameters probably allows to better understanding of mechanisms of the cardiovascular system diseases as well as the further development of the new treatment in these pathology.