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Fund “Nauka” Project № 19028 Resume – Competition-Based Session 2019:

“Expression of peptide Apelin in neurogenic zones in the human adult brain after stroke”

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The Apelin receptor (APLNR) is expressed in different regions in the brain, and its function is achieved by binding of Apelin-ligand.

The binding of different ligands (apelin-13, apelin 17, apelin-36) to the apelin receptor is related to the regulation of several processes the human body, including those related to ischemic damage. There is limited scientific evidence showing the role of Apelin/ Apelin receptor system in cerebral ischemia. Apelin exerts a putative protective effect. Its effects are associated with facilitated angiogenesis, inhibition of apoptosis, and overall damage reduction in the ischemic penumbra.

Our data show an increase in Apelin gene expression more than twice after global cerebral ischemia in monkeys.

Several studies have shown a stroke induces proliferation and differentiation of progenitor/stem cells in the subventricular and subgranular areas of the mammalian brain, but its relation to the Apelin signalling system is not yet clear.

The purpose of the current study is to demonstrate the expression of Apelin ligand in the vicinity of ischemic stroke and neurogenic niches in the human brain. We hypothesize that APLN is expressed by progenitor cells in the nearby vascular niche cells, as well as by cells from the penumbra region of the stroke. In this project, we plan to determine the number and the phenotype of the cells that express APLN in the described areas. Images obtained after immunofluorescence staining will be quantitatively analyzed and subjected to further statistical processing.

Achieved results:

1. For the first time the presence of APLN+ cells was described in the human SVZ.
2. For the first time the phenotypical characteristics of APLN+ cells in the human SVZ.
3. For the first time was shown that APLN+ cells are located in the ischemic core and penumbra in human.