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Fund "Nauka" Project № 22020 Resume – Competition-Based Session 2022: "Expression and effects of the apelinergic system in the subventricuar zone of some mammals"

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Stem cells in the adult brain are mainly located in the subventricular zone (SVZ), which lines the lateral ventricle of the brain. The SVZ extends from the anterior horn of the lateral ventricle (anterior SVZ; SVZa) to its temporal/inferior horn (inferior SVZ, SVZi), with only SVZa having the ability to generate neurons from stem cells. Differences in the neurogenic potential between SVZa and SVZi are likely due to differences in the molecular regulation of stem cells in the two zones. Our previous studies have shown that the small peptide apelin receptor (apelin receptor, APLNR) has different expression characteristics in SVZa and SVZi. The aim of this project is to investigate the detailed expression of APLNR in the neurogenic zone SVZa and the effects of the apelin ligand on different subpopulations of undifferentiated cells in vitro. To achieve this goal, APLNR will be phenotyped on histological sections of human, monkey, and mouse brain. The effect of apelin ligand and apelin blocker will also be tested on cell cultures and organotypic sections from mice. The goal is to identify a group of APLNR-positive cells located in the SVZ and understand the molecular mechanisms associated with its activation in the brain of mammals. It is expected to determine how the apelinergic system influences neurogenesis processes, which will provide a basis for future applied studies with regenerative applications.

Within the project, for the first time in the world will be reported:

- 1. Phenotypic characteristics of APLNR-expressing cells in SVZa (micrographs and data on the percentage of different cell classes expressing APLNR in the zone);
- 2. Effects of apelin ligand/ blocker on organotypic slice cultures (micrographs and percentage of proliferating cells relative to the total number of cells);
- 3. Effects of apelin ligand/ blocker on cultures of primary microglial cells (micrographs and percentage of proliferating cells relative to the total number of cells);
- 4. Effects of apelin ligand/ blocker on SH-SY5Y cell cultures (micrographs and percentage of proliferating cells relative to the total number of cells).