Effect of aniracetam on phosphatidylinositol transfer protein alpha in cytosolic and plasma membrane fractions of astrocytes subjected to simulated ischemia in vitro

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Abstract:
Brain ischemia affects phosphoinositide metabolism and the level of lipid-derived second messengers. Phosphatidylinositol transfer proteins (PI-PTs) are responsible for the transport of phosphatidylinositol (PI) and other phospholipids through membranes. Isoform of PI-TPs (PI-TPα) is an essential component in ensuring substrate supply for phospholipase C (PLC). The current study was conducted to examine potential effect of aniracetam on PI-TPα expression and to characterize the PI-TPα isoform distribution between membrane and cytosol fractions of astrocytes exposed to simulated ischemia in vitro. After 8 h period of ischemia, the level of PI-TPα was significantly higher in cytosol (by about 28%) as well as in membrane fraction (by about 80%) in comparison with control. We have found that aniracetam treatment of astrocytes in normoxia significantly increased the level of PI-TPα in membrane fraction with a maximal effect at 0.1 μM concentration of aniracetam (by about 195% of control). In membrane fractions of ischemic cells, aniracetam increased PI-TPα expression in a concentration-dependent manner. In ischemic cells, aniracetam (10 μM) has elevated PI-TPα expression up to 155% and 428% in cytosolic and membrane fractions in comparison with ischemic untreated cells, respectively. The study has shown that aniracetam significantly activates PI-TPα in cell membrane fraction and this effect might be connected with previously described activation of MAP kinase cascade.

Key words: aniracetam; astrocytes; ischemia; phosphatidylinositol transfer protein-α