ROLE OF FEMALE GONADAL HORMONES ON NTPDASE2 PROPERTIES IN HIPPOCAMPAL GLIOSOMES

Dragić M, Mitrović N, Grković I
VINCA institute for Nuclear Sciences, Department for Molecular biology and endocrinology, University of Belgrade, Belgrade, Serbia

In the central nervous system, glial cells provide trophic, structural and metabolic support to neurons. Since NTPDase2, an ecto-enzyme that preferentially hydrolyzes ATP, is expressed by rat astrocytes, we examined extracellular adenine nucleotides hydrolysis during oestrus cycle in the hippocampal glial subcellular particles (gliosomes). We also examined whether gonadal steroid hormone deprivation, induced by bilateral ovariectomy (OVX) will affect NTPDase2 function and the role of exogenous 17β-estradiol (E2). Determination of the oestrus cycle stage was evaluated by proportion of specific cell types in the vaginal smear. The rats were submitted to OVX and three weeks after the surgery injected with a single dose of E2 (33.3μg/kg). The alteration in ATP hydrolysis were not observed while ADP hydrolysis showed cyclic fluctuations across the estrus cycle ($p<0.01$). In OVX animals, we observed significant decrease in ATP hydrolysis ($p<0.01$) compared to all three phases, while ADP hydrolysis was similar to the ADPase activity at proestrus. Immunoblotting analysis confirmed NTPDase2 as dominant ectonucleotidase in the hippocampal gliosomes, whose relative protein abundance also decreases after OVX and up-regulated after the treatment. ATP/ADP hydrolyzing ratio strongly argues in favor of NTPDase2, which is confirmed by immunoblot analysis. Since OVX might induce astrocytic responses similar to those observed after injury and affect neuronal chemistry and morphology, our finding that E2 upregulates NTPDase2, potent modulator of inflammatory reactions within the hippocampus, could represent a useful therapeutic target in human disease.

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