IJAE
Vol. 116, n. 1 (Supplement): 55, 2011
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

Dopamine D3 receptor, neurofibromin and amyloid precursor protein expression during learning

Velia D'Agata[1], Agata Grazia D'Amico[1,2], GianMarco Leggio[2], Alessandro Castorina[1], Salvatore Giunta[1], Maria Luisa Carnazza[1], Filippo Drago[2]

[1] Department of Bio-Medical Sciences
[2] Department of Clinical and Molecular Biomedicine, University of Catania, Catania, Italy

Among dopamine receptors, the Dopamine D3 receptor (D3R) has been extensively characterized. It is distributed with highest densities in the limbic system and plays an important role in cognitive, emotional and endocrine functions. Like D3R, NF1 and APP genes are also involved in memory processes. Neurofibromin is a large tumor suppressor protein encoded by Neurofibromatosis type I gene (NF1). Amyloid precursor protein (APP) is the precursor of the amyloid-beta (Aβ) peptides involved in the pathogenesis of Alzheimer's disease. Previously, it has been proposed that neurofibromin forms a binding complex with APP that interacts with D3R (Donarum EA et al., 2006). In addition, we have demonstrated that the absence of D3R is correlated to modifications in the expression of both NF1 and APP. Since these genes are all involved in cognitive processes, we have investigated whether such correlation is also present during a specific learning task. D3R, NF1 and APP expression levels were assessed in hyppocampi of mice subjected to the passive avoidance test. Animals were divided into four groups: naive, unconditioned stimulus trained (USTA), conditioned stimulus trained (CSTA) and conditioned (CA). mRNA and protein levels were analyzed by quantitative real time PCR and Western blot. Results showed that hyppocampal D3R expression was significantly increased in CA as compared to naive and, to a greater extent, in CSTA and USTA. Concurrently, increased NF1 expression was also found in CA and CSTA, but not in USTA. APP expression was unchanged both in CA, in CSTA and USTA as compared to naive animals. In conclusion, these data suggest that D3Rs may be correlated to passive avoidance-related learning, whereas both NF1 and APP do not seem to be directly linked to D3Rs during the acquisition of this specific learning task.

Keywords: dopamine D3 receptor, neurofibromin, amyloid precursor protein,