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Poster Presentation

Expression of GDNF Genes in the Cerebellum of Rat Neonate Born to Mother with Diabetes

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Abstract

Diabetes Mellitus as a common metabolic disorder in women of reproductive age is rising throughout the globe. Diabetes in pregnancy has various adverse outcomes on different organs development including the central nervous system (CNS) and it can cause learning deficits, behavioral problems and motor dysfunctions in the offspring. The cerebellum is a part of brain that coordinates voluntary movements and controls balance and also participate for motor learning, and language processing. Neurodevelopmental assessment of the child born to diabetic mothers has displayed a short and long-term neurocognitive and neurobehavioral abnormalities in the offspring. Even though neuronal death has also known the main leading cause of diabetic CNS and peripheral neuropathies, the exact mechanism of neuronal death in diabetes type I mellitus has not been completely understood yet. Neurotrophic factor family (NTFs) consists of: nerve growth factor (NGF) family, glial cell line-derived neurotrophic factor family ligands (GDNF) and some cytokines. Several processes in neuronal cells such as survival, migration, neurite outgrowth, formation of synapses and neuronal plasticity are controlled by NTFs. In the majority of experimental studies the important role of GDNF and its receptor components (GFRα1 and Ret) in the survival of different populations of neurons in the central and peripheral nervous systems have been proved. Beside the expression of GDNF in developing Purkinje cell and granule cell layers in many researches has shown. In spite of the fact that subsequent studies demonstrated molecular layer interneuron (MLIs) are essential for normal cerebellar function and motor learning, signals controlling survival and mechanisms migration of Purkinje cells (PCs) from the ventricular zone to form the PC plate during embryonic development of the cerebellum are incompletely unknown. In previous studies reported that the neurotrophic receptor GFRa1 is transiently expressed in developing PCs and loss of GFRa1 delays PC migration. Regarding above mentioned facts, since cerebellum is one of the important parts in the brain for memory/learning processing; on the other hand expression GDNF and GFRα-1 is essential for the development and PCs migration, this study aimed to investigate mRNA expression and distribution pattern of GDNF in different layers of cerebellum in early postnatal development in diabetics' rat off springs.

Keywords: GDNF, Cerebellum, Purkinje Cells

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