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CELLULAR PRION LEVEL IN THE RATS' MEDULA OBLONGATA AND CEREBELLUM DEPENDING ON AGE

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Prions are protein infectious agents of neurodegenerative diseases during the development of which are spongiform changes of the CNS. Prion infections are registered in animals and in people. Its clinical picture is presented by rapidly progressive dementia, visible movements disorders that usually cause death. Neuronal degenerative changes, vacuolization of neurons, proliferation of astrocytes in the brain cortex, stem and cerebellum after histological research study of the brain after death of TSE patients have been shown. The causative agent is abnormal (infectious) prion (PrP^{Sc}, Sc — from scrapie), but cellular prion (PrP^{C}, C — from cellular) is a substrate for the PrP^{Sc} conversion and differs only in molecule conformation. The diseases occur not only as a result of infection but can be sporadically especially in older persons. The study of the physiological role of PrP^{C} in many cellular processes is important for understanding the mechanisms of neurodegeneration caused by PrP^{Sc} neurotoxic effect or loss of PrP^{C} functionality. It is known that PrP^{C} is a membrane protein. It participates in cell adhesion and recognition, regulation of Ca^{2+}-transport and other ions through the membrane, antioxidant and antiapoptotic protection and other important processes. PrP^{Sc} destroys PrP^{C} but does not assume the discharge of its functions, causing significant disruption of cell metabolism.

The aim of the work was to determine the level of *PrP^{C}* as a precursor of pathological prions in medulla oblongata and cerebellum tissues of different age rats.

By the results of dot blot analysis was determined the total *PrP^{C}* level in young animals' medula oblongata (29.38±1.93 standard units) and cerebellum (40.75±2.10 standard units). Its level was increased by 23–70 % in mature animals' tissues compared to young animals while in the old rats it was decreased by 48 % compared to mature rats. Age dynamics of the *PrP^{C}* glycoforms expression level was the similar which was studied by the western blot analysis. The expression level of PrP^{C} glycoforms (di-, mono- and nonglycosylated) increased in six months animals' medula oblongata (by 36–77 %) and cerebellum (by 14–63 %). The *PrP^{C}* glycoforms level decreased in thirty months animals' tissues but the nonglycosylated form level increased by 40 % in medula oblongata. It is important that the nonglycosylated form level increased in the mature animals' cerebellum by 63 % compared to young animals and has not significantly changed in the old animals' cerebellum.

Thus, the PrP^{C} amount is the lowest in the one month rats' tissues. The prion level increases in the age of six months animals, and its amount decreases in thirty months animals. Mostly such level fluctuations due to changes of diglycosylated form expression level.

The *PrP^{C}* level decreasing in old animals' tissues, possibly caused by point mutations and the accumulation of incorrectly packed proteins. The mutated cellular prion loses its physiological function. Such modified proteins can accumulate in the cell and under certain conditions convert into pathological form, changing the conformation of the molecule.