

UDC 57.017.23+112.7:352.465:151.643

# CELLULAR PRION LEVEL AND ATPases ACTIVITIES IN THE SPLEEN OF DIFFERENT AGE *WISTAR LINE* RATS

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Prion infections are dangerous and lethal neurodegenerations of the humans and animals. The main causes of these infections are due to an infectious protein (pathological prion PrP<sup>Sc</sup>). In experimental mice PrP<sup>Sc</sup> was found in the spleen and lymph nodes on 5–13<sup>th</sup> week after injection. However, cellular prion (PrP<sup>C</sup>) is a substrate for the PrP<sup>Sc</sup> conversion. Because of the sporadic diseases occur in older age persons, we investigated the PrP<sup>C</sup> level in the jejunum of rats of different ages.

The aim of this study was to determine the ontogenetic changes of PrP<sup>C</sup> level and activities of Na<sup>+</sup>/K<sup>+</sup>- and Ca<sup>2+</sup>-ATPases in the rats' spleen and calculate the correlation between these parameters.

Research was carried out on the males of laboratory rats *Rattus norvegicus var. alba*, *Wistar line*. The animals aged 1, 6 and 30 months were decapitated under ether anesthesia, the spleen was selected for this research. A western blotting analysis of the spleen was carried out. The activities of Na<sup>+</sup>/K<sup>+</sup>-ATPase, PMCA and SERCA were determined by W. Rathbun method. The level of sodium and potassium ions in tissues was determined using the commercial kits (*Felicity diagnostics*, Ukraine) and the level of total calcium was determined using atomic absorption spectrophotometer C-115M.

The PrP<sup>C</sup> diglycosylated (35–38 kDa) glycoform level was 66 standard units, the partially (mono) glycosylated (23–27 kDa) form level was 90 standard units and nonglycosylated (19–21 kDa) form level was 64 standard units in the one-month rats' spleen. The di-, mono- and nonglycosylated PrP<sup>C</sup> forms levels were increased by 18, 68 and 33 % in the six months rats' tissue compared to one month age rats. The diglycosylated PrP<sup>C</sup> form level was decreased by 28 % in old rats' spleen compared to mature animals. The other forms levels were decreased in 2 times in the thirty months rats' tissue compared to the six months. The Na<sup>+</sup>/K<sup>+</sup>-ATPase, SERCA and PMCA activities decreasing by 83, 84 and 68 %, respectively, in the thirty months animals' tissue was demonstrated. The Na<sup>+</sup> and K<sup>+</sup> levels were unchanged, instead total calcium level was increased by 80 % compared to the six months animals' spleen. Kinetic characteristics of ATP hydrolysis by the investigated enzymes were also changing with animals' age increasing. The values of initial reaction velocity ( $V_0$ ) and maximum amount of reaction product ( $P_{max}$ ) were decreased by 68–82 % and 64–89 %, respectively, the value of reaction time ( $\tau$ ) was increased by 27–37 %. The maximum velocity of the enzymatic reaction ( $V_{max}$ ) value under these conditions was lower in 3–22 times, while Michaelis constant ( $K_m$ ) value was lower in 2–7 times which indicates a growing affinity to the enzyme substrate (ATP). By the results of correlation analysis, a different correlation between the PrP<sup>C</sup> level and enzymes activities were carried out ( $r=0.253-0.634$ ). A direct strong correlation between the activities of enzymes with each other ( $r=0.998-0.999$ ) and between the ATPases activities and ions level was calculated. However, an inverse correlation between Na<sup>+</sup> and Ca<sup>2+</sup> was observed.

PrP<sup>C</sup> level is the smallest in young animals' spleen, it increases in six months animals and decreases in thirty months animals. The activities of ATPases as well as the kinetic characteristics of ATP hydrolysis decrease depending on the animals' age increasing. But value of  $\tau$  was increased. There is a correlation between the ontogenetic changes of PrP<sup>C</sup> level and transport enzymes activity in the different age animals' spleen.