

Autophagy is a nonspecific catabolic mechanism, important for maintaining the cellular homeostasis. Stress condition can increase the activity and support the cell survival. It is well known that normal and pathological aging are associated with a reduced autophagic potential and that experimental induction of autophagy leads to higher longevity of certain model organisms. This decreasing may be facilitated by other factors, such as chronic stress. Higher age and chronic stress are two factors contributing to the development of neurodegenerative diseases, in this context the mechanism of autophagy is now actively studied. We wanted to know if and how the combination of these two factors may influence the activity of autophagy. In our study, we investigated the role of aging and chronic stress, induced by social isolation in Wistar rats at the age of 6 (N= 16) and 12 (N= 16) months. The animals in experimental groups were separated in the individual cages for 4 weeks. Control groups animals were housed in the pair. We measured the markers of autophagy expression (Beclin-1, LC3-II, mTOR) in the hippocampus and striatum of socially isolated and control groups animals. We measured the expression of NMDA receptor subunits (NR1, NR2A, NR2B) in the hippocampus of the same animals. Our results showed that older animals in the control group had decreased expression of Beclin-1 and LC3-II ($p < 0,001$), indicating reduced autophagy. In a socially isolated aged group, we found decreased expression of LC3-II ($p < 0,001$), and increased expression of mTOR ($p < 0,05$) in the hippocampus. Social isolation did not have a significant effect on the activity of autophagy compared to the control younger group of animals. In the elderly, decreased LC3-II ($p < 0,01$) expression in the hippocampal region was observed. In the hippocampus region, the expression of NR2A and NR2B ($p < 0,001$) subunits in older animals was significantly increased compared to younger ones. Due to social isolation, only NR1 subunit expression was increased ($p < 0,01$). According to our results, aging has been shown to be a more significant regulator of autophagy compare to long-term stress induced by social isolation. However, it is not yet clear whether the length of social isolation was sufficient enough to induce a stress response. This question remains to be answered in future studies.