Cathepsin B Activity: Stress and Aging

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Cathepsin B (Cat-B) is a lisossomal cystein protease whose abnormal function is related to several illnesses, such as Alzheimer's disease. We have already shown a relationship between Cat-B inactivation and amiloyd-ß peptide accumulation. Since this protease is associated to both neurotoxicity and neuroprotection, the aim of this study was to evaluate the activity of Cat-B in brains of young and aged rats. After young (3-months-old) and old (22-months-old) rats were submitted to a memory trial (passive avoidance), the cortex, hippocampus and other brain regions were tested on Cat-B activities. Carboxydipeptidase activity was measured on the Abz-GIVRAK-(Dnp)-OH hydrolysis, pH 4.50, and endopeptidase activity on the Z-FR-MCA hydrolysis, pH 6.21. The specificity was confirmed by Ca074, which totally inhibited both activities. The endopeptidase activity was increased in the old group in all tissues, indicating that this activity may be related to aging. The carboxydipeptidase activity was increased in the old group in the cortex and other brain regions, but not in the hippocampus. Besides, the stress related to the memory test did not affect Cat-B activities in the cortex and hippocampus, in contrast to the other brain regions of the young group that showed an increase in both activities when compared to the control (4-months-old, not stressed) animals. In conclusion, these results suggest that the Cat-B activity profile can be altered along the aging process, because the endopeptidase activity was higher in brain tissues of old animals and the carboxydipeptidase activity was not increased in hippocampus, but increased in the cortex and other brain regions. (Supported by FAPESP, CAPES and CNPq).