

Our work is composed of part done on laboratory rat, part done on magnetic resonance images and autoptic CNS tissue in patients with Alzheimer's disease (AD) and control group. In the first part we observed volumetrically and stereologically morphological, right-left asymmetries of structures of CNS, gross marks of neurodegeneration and changes in the number of neurons and conditioned taste aversion (hippocampus, prefrontal cortex, parabrachial nucleus, amygdalar complex). We measured under normal conditions and under chronic stress induced by corticosterone. Chronic stress is possible candidate for AD development in humans. We found that structural lesion is side specific (on the right) and it is bound rather to subcellular level and not to absolute neuronal numbers changes. In the second part we examined changes in the grey matter of the CNS (by automatic segmentation and manually) and changes in the white matter of the CNS (tractography) in patients with AD and in controls on magnetic resonance. In the autoptic tissue we focused on asymmetrical morphological changes in the planum temporale and neurohistological changes in its third neuronal layer. We found out that decrease of the hippocampal volume is not accompanied by cerebellar or pontine volume and that reorientation of images is not necessary for stereology. Next we found that third layer of the planum temporale cortex could be used for post mortem diagnostics of the AD. Tractography revealed decrease of number of white matter fibers in fornix, corpus callosum and gyrus cinguli except for posterior part of the callosal body.