Work objectives: The aim of this diploma work was taking up with microscopic identification metods of particular cell types of CNS, detection of blood-brain-barrier permeability and "dying" neurons. We are interested how the cellulate elements - neurons and astrocyte - are affected by cerebral ischemia and if the permeability of the blood–brain barrier is disrupted.
Methodology: Experiments were performed in Wistar rats on postnatal day 12 or 25 (17 together). Cannula for vasoconstrictor Endothelin-1 infusion was inserted into left hemisphere to induce focal cerebral ischemia. Animals were let to live for 24 hours and then all rats were deeply anesthetized with urethane injection. The brains were sectioned in the coronal plane 50m thick. Adjacent series of sections were processed for Fluoro-Jade B to detect degenerating neurons, blood–brain barrier disruption was investigated using Evans Blue dye. Immunohistochemical labeling was used for IgG and visualization of hypertrofic astrocytes by GFAP. Common observation of brain was preformed under upride microscope with fluorescence.
Results: Our findings demonstrate that focal cerebral ischemia generates induced by ET-1 into cerebral tissue damage. Degenerating neurons were observed in affected areas. Blood-brain barrier is disturbed in the same area as degenerating neurons. We also observed aktive astrocyte in ischemic area which help to eliminate necrotic tissue and also synthesize proinflamantory cytokines. Sign of the inflammatory response is infiltration of leukocytes (neurophile) into ischemic brain region. Permeability of bloodbrain barrier increases due to infiltration of IgG into damage tissue.
Key words: CNS, neuron, astrocyte, blood-brain barrier, stroke