Abstract:

Title: Functional consequences of perinatal hypoxia–ischemia in rat

Objectives: The aim of this diploma thesis is to design a set of behavioral tests which provide an effective assessment of motor and cognitive–behavioural deficits in adults rats after experimental hypoxic–ischemic insult during the perinatal period (P7). Supposed benefit is to establish a model of motor and cognitive–behavioural abilities of individuals after this procedure.

Methods: The present thesis has a theoretical–empirical character. The practical part describes how the experiment was performed. 32 long Evans Rats were randomly devided into two groups: experimental group (HIE) and control group (Ctrl). The method to produce hypoxic–ischemic brain damage in the 7 day–old rats consisted of right common carotid ligation followed by systemic hypoxia by the inhalation of 8% oxygen and 92% nitrogen. The adult animals (55–75 days old) were tested by the following list of behavioral tests: Bar holding test, Rotarod test, Ladder rung walking test, Reaching test, Open field test and Morris water maze test. Sigma Plot and Microsoft Excel 2010 were the programs used for statistical analysis.

Results: Results of Open field test, Ladder rung walking test and Morris water maze test confirmed that hypoxic–ischemic insult affects the emotional state in the form of increased anxiety. Morris water maze resulted in the reduction of long–term memory and behavioural flexibility. There was a significant difference ($p < 0,05$) between the HIE and the Ctrl groups in testing of behavioural flexibility. No deficits were found while performing the locomotor and senso–motor tests: Rotarod test, Bar holding test and Ladder rung walking.

Key words: hypoxic–ischemic encephalopathy, periventricular leukomalacia, motor deficit, cognitive deficit, functional assessment