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Gender-linked differences in rat brain after transient global cerebral ischemia

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The aim of our study was to examine putative gender differences in expression of various proteins that have a specific role in progression of brain injury and cell repair following transient global ischemia (TGI). Adult male (♂) and ovariectomized female (♀) rats (n=42) were divided into 3 main groups: naive, sham-operated and TGI. TGI was induced by occlusion of the common carotid arteries with hypovolemic hypotension (RR~40 mmHg; for 5 or 10 min [TGI5; TGI10]). Three days after TGI animals were sacrificed. Western blot was used to detect connexin, pro- and antioxidant enzymes as well as pro- and antiapoptotic protein expression levels in hippocampus. TGI5 in ♂ rats caused a decrease in nNOS expression (81,0±6,3% of control) that could be due to neuronal loss; while the observed decrease in Cx30 (82,7±2,3% of control) could prevent transduction of apoptotic signaling. However, in these animals, the expression of MnSOD, Bax, and Bcl-2 was less affected. TGI10 resulted in death of all ♂ animals within a day. In ♀ rats, TGI5 did not significantly change the expression of investigated proteins, but after TGI10, Bcl-2/Bax protein ratio was enhanced, which could initiate a cascade of events leading to neuroprotection. This study shows that ♂ rats are more sensitive to TGI insult than ♀ rats. Further, TGI affects protein expression differently in ♂ and ♀ animals which might explain observed gender differences in sensitivity to brain ischemia.

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