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IMPACT OF α-LIPOIC ACID ON BRAIN ANTIOXIDANT STATUS AND OXIDATIVE DAMAGE IN INSULIN-RESISTANT RATS

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Relevance. α-lipoic acid (ALA) has a mitigating effect on symptoms of cerebral insulin resistance. Despite many studies on various diseases, there is still no study that evaluates the effect of ALA on brain metabolism in the course of insulin resistance or type 2 diabetes.

Target. Assessment of α-lipoic acid's effect on hypothalamic and cortical redox status and oxidative damage in an *in vivo* model.

Materials and methods. In this study, male Wistar rats were fed a high-fat diet (HFD) for ten weeks. ALA was administered intragastric for four weeks. Total antioxidant capacity (TAC) was used to assess redox status and malondialdehyde (MDA) concentration - for oxidative damage.

Results and their discussion. HFD reduced TAC in the hypothalamus of not-fed ALA group (ALA-) but increased it both in the hypothalamus and the cerebral cortex of HFD ALA group (ALA+). Supplementation of ALA enhanced hypothalamic and cortical TAC in HFD-fed group in comparison to control and HFD-fed ALA- groups. The concentration of MDA was raised both in the hypothalamus and the cerebral cortex of HFD ALA-, as well as in the cerebral cortex of HFD ALA+. Hypothalamic MDA level was lower in HFD-fed group after ALA administration. Moreover, cerebral MDA content in HFD-fed ALA+ was higher than in control ALA-. Due to the above, admission of ALA improves redox status and also protects from oxidative damage in the hypothalamus, but not in the cerebral cortex.

Findings. To sum up, the results showed the beneficial effect of ALA on both redox status and oxidative damage of only the hypothalamus of insulin-resistant rats' brains. However, other studies are required in order to recognize the molecular mechanism of ALA brain action.