

OXIDATIVE AND ENERGY STATUS OF BLOOD DURING THE EXOGENOUS NO-THERAPY OF COMBINED THERMAL INJURY IN THE EXPERIMENT

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Introduction. The exogenous NO-therapy includes the effect of the cold-plasma flow and the properties of the nitric oxide (NO) molecule. This compound is known for its antibacterial properties, and it is also a universal regulator of metabolic processes [1, 2]. Usage of pharmaceuticals to regulate the synthesis of NO in the body is associated with the occurrence of a number of side effects; therefore, an additional search for noninvasive physical regulators of NO is needed, and an assessment of their effect in the treatment of burn wounds.

The aim of the study was to evaluate the specific activity of oxidoreductases in the blood of rats with combined thermal injury (CTI) after NO-therapy of burn wounds.

Materials and methods. The experiment was carried out on male rats of Wistar line weighing among 200 – 250 g. All animals were kept in standard vivarium conditions in cages with free access to food and water. After the quarantine (14 days) three groups of animals were formed: the 1st group (n = 10) is the intact animals, the 2^d (n = 10) is control group, the 3^d (n = 10) is experienced group. The rats of control and experimental groups simulated a CTI by applying a burned hot body to a 20% epilated body surface (3c) and a thermo inflammation injury (10c) by combustion products in a desiccator; animals were deduced from the experiment on days 14th. Rats of 3^dgroup were irradiated daily by a stream of "Plazon" apparatus air plasma at the distance of 1 cm from the burn surface within 2 minutes. Due to the short lifetime of the NO molecule, as well as the design features of the apparatus, the concentration of nitric oxide reaching the burn surface was ~ 3000 ppm on the gas flow axis.

The specific activity of aldehyde dehydrogenase (AIDH), lactate dehydrogenase in direct reaction (LDHdir), lactate dehydrogenase in reverse reaction (LDHrev), SOD and catalase, the protein content were determined in the blood of rats by spectrophotometric methods on the Power Wave spectrophotometer (Japan). The research results were processed using Statistica 6.0 (StatSoft Inc., USA).

Results. As a result of the experiment, the reduction in the specific activity of SOD at the CTI on the 14th day was 2.75 times ($p = 0.029$) compared with the norm. Catalase activity decreased in 6.90 times ($p = 0.034$) on 14th day of CTI. The obtained data corresponds to the picture of developing hypoxia, activation of lipid peroxidation, and the dynamics of indices in toxemia, ends between 7 and 14 days. In comparison with the control experiment, an increase in the specific activity of SOD was observed by 1.28 times ($p = 0.023$) on the day 14 of treatment. The increase of

catalase activity was established in 1.64 times ($p = 0.027$) on the 14th day of treatment. Thus, we can assume that the use of "Plazon" in the treatment of thermal injuries can reduce the treatment time, increasing the healing rate of the wound, normalizing the antioxidant status.

The specific activity of LDHdir decreased in 2.44 times ($p = 0,023$), LDHrev – in 1.65 times ($p = 0,031$), at CTI compared with the intact animals. The decrease in LDH activity may contribute to the accumulation of lactate in tissues of the burned rats, which is an indirect indicator of tissue hypoxia. It was noted that under the influence of exogenous NO-therapy, activity of LDHdir increased in 1.78 times ($p = 0,029$) compared to rats with CTI. In this case, the specific activity of LDHrev under the action of exogenous NO increased in 1.87 times ($p = 0.032$) compared to animals with CTI. It was shown that the specific activity of AIDH decreased in 1.85 times ($p = 0,033$) in comparison CTI with the intact rats. Reducing of the enzyme activity leads to accumulation of a large amount of aldehydes, which are toxic to burned rats organisms. However, due to the application of exogenous NO-therapy to the burn wound of rats, the specific activity of AIDH in the blood increased in 5,98 times ($p = 0,035$) compared to animals with CTI.

Conclusion. It was revealed that the application of exogenous NO-therapy during 14 days to rats with the burn wound of CTI caused to an increased specific activity of LDHdir and LDHrev, as well as AIDH, SOD and catalase compared with burned animals.

The data indicate an accelerated cure of thermal trauma with application of the "Plazon", being that a reduction in the stage of toxemia, accelerated normalization of the antioxidant status of the organism was established.

References

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