

# EFFECT OF *ESCHERICHIA COLI* ENDOTOXIN ON VITAL FUNCTIONS OF RATS AFTER INTRANASAL INJECTION

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It has been experimentally proven that endotoxins are involved in the pathogenesis of neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, multiple sclerosis, amyotrophic lateral sclerosis. It happens due to the fact that endotoxin during intranasal administration is the closest to the natural way of penetration of a foreign agent into the body. In this regard, study of the effect of lipopolysaccharide from *Escherichia coli* (LPS) on somatic and visceral functions of the body is very important [1,2].

The aim of the study is to analyze changes in blood pressure, deep body temperature and the latent period of nociceptive reaction with prolonged intranasal administration of LPS.

The experiments were carried out with male Wistar rats weighing 280-320 g (n = 28), which were instilled intranasally with LPS daily (1; 10; 100 µg / ml) in a volume of 25 µl daily for 21 days. An apyrogenic saline solution (ASS) was used as a solvent for LPS, and it was used as a control. The parameters were recorded before the start, then - weekly on the 7th, 14th, 21st day of the experiment. All animals were divided into 4 groups depending on the dose of the injected substances: group 1 - ASS, group 2 - LPS 1 µg / ml, group 3 - 10 µg / ml, group 4 - 100 µg / ml. All experiments were carried out taking into account the recommendations of the European Convention on Humane Treatment of Laboratory Animals [3].

It has been established that the intranasal administration of ASS does not affect the latent period of nociceptive reaction, blood pressure, and deep body temperature.

On the 7th, 14th and 21st days of the experiment, a dose-dependent increase in blood pressure was recorded in all the studied groups of experimental animals. An increase in deep body temperature was observed in the third group of animals on the 21st day of the experiment ( $39.3 \pm 0.2$  °C) relative to the control group of animals ( $38.5 \pm 0.2$  °C). In the fourth group, an increase in deep body temperature was recorded already on the 7th ( $39.1 \pm 0.5$  °C), the 14th ( $39.0 \pm 0.5$  °C) and the 21st day ( $39.0 \pm 0.4$  °C) experiment. A decrease in latent period nociceptive reaction was observed only in the fourth group of rats on the 14th and 21st days ( $5.9 \pm 0.6$  s and  $7 \pm 1.6$ , respectively,  $p < 0.05$ ). The values of blood pressure, deep body temperature and the nociceptive reaction period returned to the initial values 7 days after the end of the experiment.

It was shown in experiments that intranasal infusion of *E. coli* lipopolysaccharide is accompanied by a decrease in the threshold level (hyperalgesia), a dose-dependent increase in blood pressure and an increase in deep body temperature. The data obtained indicate that with chronic penetration of endotoxin into the body through the mucous membrane of the nasal cavity, the thermoregulatory and cardiovascular system reacts primarily and nociceptive sensitivity threshold decreases only two weeks later.

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[1] Hunter, R. L., Cheng, B., Choi, D.-Y. et al., Intrastriatal lipopolysaccharide injection induces parkinsonism, *Journal of Neuroscience Research* **8** (2009). doi:10.1002/jnr.22012

[2] Chae C. U., Lee R. T., et al. Blood pressure and inflammation in apparently healthy men, *Hypertension* **38**, 399–403 (2001).

[3] European Convention for the protection of vertebrate animals used for experimental and other scientific purposes, *Europ. Treaty Series* **123**, (1986).