The effect of exogenous BRT on the level of serum corticosterone when exposed to the adrenal glands in experimental animals

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Introduction

Bioresonance therapy (BRT), both exogenous and endogenous, is one of the promising therapeutic methods, which, along with high therapeutic efficacy, are characterized by the absence of side effects and exclude the possibility of adverse effects on the patient's body [1]. The end result of treatment with BRT is to achieve the necessary (desired or predetermined) effect, which can be both therapeutic and prophylactic in its focus, which can be considered as a control process in the presence of deviations in the functioning of a particular body system from that value. , which is defined as the norm. The result of this type of management is the achievement of that physiological norm, which is characteristic of a given individual,

At the same time, exogenous BRT, being an additional factor in the treatment of certain diseases, has a wide range of therapeutic capabilities and allows treatment using external electromagnetic fields with a fixed frequency or a set of frequencies. Based on the results of numerous studies, it can be assumed that the most promising for these purposes is the use of alternating magnetic fields, since they have a local effect in the area of the inductor and a reflex effect on all organs and systems of the body [2]. Due to the fact that the neuroendocrine system is responsible for the processes of homeostasis in the body, it is assumed that the use of a local effect of exogenous BRT on the adrenal gland area would make it possible to realize a therapeutic effect,

Thus, the aim of the study appeared grade activity glucocorticoid function of the adrenal glands under conditions of local exposure to the adrenal gland area by exogenous BRT, depending on the frequency and magnitude of magnetic induction.

Materials and methods

The studies were carried out on 200 white nonlinear male rats weighing 200–220 g, which were kept in a standard diet and vivarium regime with free access to water and food in collective cages [3]. Animals were divided into the following groups: 2 control groups in vivarium (10 animals each), 2 control groups in individual cages (10 animals each) and 8 experimental groups in individual cages (20 animals each). Exogenous BRT was performed using the apparatus

MINI-EXPERT-T (IMEDIS, Russia) for induction magnetotherapy with an inductor. Animals of each experimental group in individual cages for 30 minutes. were subjected to exogenous BRT with a frequency of 20 Hz and 53 Hz with a magnetic induction of 0.43; 1.81; 3.06; 6.18 mT and 0.38; 1.51; 2.66; 5.93 mT, respectively. The inductor of the apparatus was located on individual cells in the area of the adrenal glands. Animals of the control groups in individual cages were in the same conditions as the groups of experimental animals, with the exception of exposure.

At the end of the exposure, the rats were decapitated under ether anesthesia; blood sampling for analysis from the animals was carried out without anticoagulants. The content of corticosterone in the blood serum of rats was determined by the enzyme immunoassay using tests for the quantitative determination of corticosterone in serum and plasma: Labor Diagnostika Nord GmbH & Co. KG, Germany (Corticosterone EIA). All studies to avoid errors associated with circadian rhythms of hormones were carried out at the same morning time of day (9.00–12.00).

The experimental data were statistically processed using the statistical software package Microsoft Office Excel 2003, BIOSTAT 5.1. In the process of statistical analysis of the differences between the control and experimental groups, the variation series was checked for normal distribution. In cases where the hypothesis of normal distribution was unacceptable, the nonparametric Wilcoxon-Mann-Whitney test was used.

Results and discussion

The obtained results of the study showed that the effect of exogenous BRT on the adrenal glands with the used frequencies and values of magnetic induction changed the glucocorticoid activity of the adrenal glands, which was assessed by the change in the content of corticosterone in the blood serum of rats. Analysis of the experimental data shows that significant ($p < 0.05$) differences in the concentration of corticosterone in the blood serum were observed in the following groups of animals - in the vivarium (29.7 ± 3.3 nmol / l) and contained in the cells of 2 control animals. groups (46.2 ± 6.0 and 49.7 ± 3.7 nmol / l). Based on this, further comparison "experiment-control", since the most correct should be carried out between the control and experimental rats in the cages.

The maximum values of the serum corticosterone content were observed in rats as a result of exposure to exogenous BRT with a frequency of 20 Hz with an induction of 1.81 mT (99.5 ± 15.6 nmol / L), which significantly ($p < 0.01$) differed from control animals (46 , 2 ± 6.0 nmol / l). Serum corticosterone was significantly ($p < 0.01$) significantly increased in animals when exposed to exogenous BRT at a frequency of 53 Hz with an induction of 2.66 mT (108.8 ± 8.5 nmol / L) compared with the control group (49.7 ± 3.7 nmol / L). It should be noted that these are not the maximum values of the magnetic field induction used by the exogenous BRT in the case of both frequencies: at a frequency of 20 Hz, the maximum of the magnetic field was 6.16 mT, at 53 Hz - 5.93 mT. Accordingly, at these maximum

values, the corticosterone content in the serum of the experimental animals differed and was 88.9 ± 6.4 nmol / L at 20 Hz and 61.3 ± 5.0 nmol / L at 53 Hz, with a significant difference from the control parameters ($p < 0.05$) was only in rats after exposure to a magnetic field with a frequency of 20 Hz.

conclusions

The results of these studies suggest that the adrenal cortex in rats, when exposed to exogenous BRT on the adrenal region of animals, exhibits hormonal activity, which can be considered one of the forms of modulation of glucocorticoid function [4]. The data obtained in the course of the experiment make it possible to consider exogenous BRT as one of those therapeutic methods that, when exposed to the adrenal glands, can be used in the complex therapy and rehabilitation of patients with various pathologies.

Literature

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