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CORRECTION OF THE FUNCTIONAL STATE OF THE BLOOD OXYGENATION SYSTEM IN DOGS BY BIORESONANCE METHOD

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Summary. The aim of the research was to justification of the peculiarities of the functioning and correction of the system of oxygenation of blood of dog organism by bioresonance method using the 'PARKES-L' device. The experiment was conducted on 20 dogs of different breeds aged 3 to 5 years and with a weight of 9–30 kg. For the experiment, four groups of animals (control and three experimental) were formed. Animals of the control and 1st experimental groups were characterized by physiological indicators of the oxygen-transport function of the blood. In animals of the 2nd and 3rd experimental groups, laboratory tests have shown a decrease in the abovementioned blood function. Physical therapy complex 'PARKES-L' was used to correct the functional state of the blood oxygenation system in dogs of the 1st and 3rd experimental groups, the working range of electromagnetic radiation frequencies ranging from 0.1 Hz to 30 Hz. Materials for research were blood samples of dogs obtained from the surface vein of the forearm, before correction, and two and five days after the beginning of the correction of the functional state of the oxygen-transport function of the blood. The effectiveness of the bioresonance method of correction of the functional state of the blood oxygenation system in dogs has been established. In particular, in dogs with a low functional state an increase in the number of erythrocytes, hemoglobin content and the average content of hemoglobin in erythrocyte as compared to the animals in the control group, which allows using this method to improve the system of oxygenation of blood in dogs.

Keywords: dogs, blood oxygenation system, bioresonance, 'PARKES-L'

Introduction. In modern biology, the human and animal organisms are considered as a complex self-regulating biological systems in which all organs and systems are closely interrelated and their activities are aimed at supporting physiological homeostasis.

Nervous and humoral regulation in the body are generally recognized and have a well-studied morphological basis, which cannot be said about the energy information system (EIS), which according to the latest data includes the following structures: energy shell, biologically active points (BAP), energy centers, in which energy is transformed and transmitted by meridians (channels) to cells, tissues, and organs (Pavlusenko, 2013; Sadykova, 2008).

Numerous studies have found that each cell, organ, system of organs, as well as the whole organism is a source of low-frequency electromagnetic radiation, parameters of which depend on the functional state of cells of organs and systems of the body (Trukhachev, 2009). In this case, physiologically normal organs and tissues generate electromagnetic radiation, differing in their parameters from cells, tissues and organs with a changed functional state (Bobritska, 2017; Kazeev, 2000).

Supply of tissues and organs depends on the degree of blood oxygenation. Oxygen provides a higher level of energy generation and energy use and it is an indicator of the intensity of metabolism. The system of oxygenation of blood depends on the content of red blood cells and hemoglobin in the body (Sadykova, 2008).

The purpose of the work was to justification of the peculiarities of the functioning and correction of the system of oxygenation of blood of dog organism by bioresonance method using the 'PARKES-L' device.

Materials and methods. The experiment was conducted in the conditions of the clinic 'Druzhochok' (Kharkiv, Ukraine) on 20 dogs of different breeds aged 3 to 5 years and with a weight of 9–30 kg. For the experiment, four groups of animals (control and three experimental) were formed. Animals of the control and 1st experimental groups were characterized by physiological indicators of the oxygen-transport function of the blood. In animals of the 2nd and 3rd experimental groups, laboratory tests have shown a decrease in the abovementioned blood function.

Physical therapy complex 'PARKES-L' was used to correct the functional state of the system of oxygenation of blood, the working range of electromagnetic radiation frequencies ranging from 0.1 Hz to 30 Hz. The effect of the device is achieved by radiation of electromagnetic pulses with infrared LEDs located on the rear and front sides of the device. This allows to apply the device by placing it on the body of dogs, as well as remotely, placing the device at a distance not more than 50 cm from the body of animals. The ‘PARKES-L’ complex has a program for correction of the functional state of the blood oxygenation system for dogs.

For dogs of experimental groups I and III there was performed correction of the functional state of the oxygen transport system according to the following scheme: twice a day the program of correction of oxygen-transfer function of blood in the following automatic mode was used: 27 min — mode of operation, 10 min — interruption, 27 min — mode of operation, after which the device automatically switches off. The program was used twice a day for 5 days in animals of the experimental groups I and III.

Materials for research were blood samples of dogs obtained from the surface vein of the forearm, before correction, and two and five days after the beginning of the correction of the functional state of the oxygen-transport function of the blood.

In whole blood there was performed: counting the number of red blood cells on a grid of Goryaev counting chamber; the hemoglobin content was determined by the cyanmethemoglobin method; hematocrit value — by centrifugation.

The data obtained in the experiments were processed statistically, determining the arithmetic mean (M), the mean square error (m) and the probability of the differences (p) between the investigated parameters. The probability of differences in average values was established according to the Student’s *t*-test.

In addition, one-factor dispersion analysis was performed to determine the degree and probability of exposure.

Results. The conducted researches showed that in dogs of the control group the amount of erythrocytes and hemoglobin content in the blood were 6.64 ± 0.13 T/l and 152.2 ± 3.6 g/l respectively, which determines the adequate supply of tissues and cells of the animal body with oxygen.

It should be noted that throughout the study period, the number of erythrocytes, hemoglobin content, and hematocrit index of the dog blood in the control group does not significantly change and fluctuates within 0.2–2.6% (Table 1).

Table 1 — Indicators of blood of dogs with the correction of blood oxygenation system (M ± m, n = 10)

Indicators	**Animal groups**			
	Control	**Experimental**		
		I	**II**	**III**
Before correction				
Erythrocytes, T/l	6.64 ± 0.13	6.5 ± 0.16	4.76 ± 0.07***	4.80 ± 0.15***
Hemoglobin, g/l	152.2 ± 3.6	151.3 ± 4.1	103.0 ± 1.4***	103.4 ± 2.8***
Hematocrit, l/l	48.8 ± 0.7	46.0 ± 1.7	33.4 ± 2.0***	34.6 ± 0.9***
In 2 days				
Erythrocytes, T/l	6.47 ± 0.15	6.63 ± 0.21	4.85 ± 0.06***	4.94 ± 0.14***
Hemoglobin, g/l	151.7 ± 3.9	156.4 ± 5.8	101.6 ± 1.5***	112.0 ± 4.3***
Hematocrit, l/l	48.7 ± 0.6	48.2 ± 1.9	33.2 ± 2.0***	36.3 ± 1.1***
In 5 days				
Erythrocytes, T/l	6.51 ± 0.13	6.69 ± 0.15	4.8 ± 0.1***	6.09 ± 0.18
Hemoglobin, g/l	149.9 ± 3.3	166.7 ± 7.2***	101.8 ± 2.2***	137.7 ± 6.5
Hematocrit, l/l	47.6 ± 0.8	50.0 ± 1.7	34.2 ± 1.0***	44.7 ± 1.8

Note. Reliable difference from the control group: * — $p < 0.05$; ** — $p < 0.01$; *** — $p < 0.001$.

Indicators of dog blood in the experimental group I before the correction of the functional state of the oxygenation system did not differ significantly from those in the control animals. Two days after the start of bioresonance correction in the blood of dogs in the experimental group I, the number of erythrocytes, hemoglobin content and hematocrit index showed only a tendency to increase (within the range of 2.0–4.8%), at that these indicators are not significantly different from those in animals of the control group at this stage of research. From the second to the fifth day after the beginning of the correction of the blood oxygenation system in animals in the experimental group I, the hemoglobin content increased by 6.6%, the hematocrit index — by 3.7%, and the number of erythrocytes — only 0.9% (although within the trend).

The low functional state of the blood oxygenation system in dogs (experimental group II) is characterized by a smaller number of erythrocytes in the blood, by 25–28% ($p < 0.001$), hemoglobin content — by 32–33% ($p < 0.001$) and a hematocrit index — by 28–32% ($p < 0.001$) compared with the control group dogs for the entire period of the research.

Before the correction of the functional state of the system of blood oxygenation in dogs of the third experimental group, the number of erythrocytes, hemoglobin content, and hematocrit index were not significantly different from those in animals of the second experimental group.

Two days after the start of bioresonance correction in animals of the third experimental group, the number of erythrocytes, hemoglobin content, and hematocrit index increased by 2.9%, 8.3% ($p < 0.05$) and 4.9% respectively. Therefore, the hemoglobin content in blood of these dogs increases by 10.2% ($p < 0.05$), and the hematocrit index by 9.3% ($p < 0.05$) compared with the animals of the experimental group II, although it is less by 25.5–26.2% ($p < 0.001$) compared with the control animals. From the 2nd to the 5th day after the beginning of the correction of the functional state of the system of oxygenation of dog blood by the bioresonance method in animals of the experimental group III, the number of erythrocytes increased by 23.3% ($p < 0.001$), the hemoglobin content — by 22.9% ($p < 0.001$), and the hematocrit index — by 23.1% ($p < 0.001$).

Moreover, these indicators are no longer different from the indexes of dogs of the control group (although they are lower within the trend by 6.1–8.1%). It should be noted that in 5 days after the beginning of the correction of the functional state of the oxygen transport system, the number of erythrocytes in the blood of dogs of the 3rd experimental group was higher by 26.9% ($p < 0.001$), the hemoglobin content — by 35.3% ($p < 0.001$), and the hematocrit index — by 30.7% ($p < 0.001$) compared with the values in animals of the second experimental group at this stage of the research.

Low frequency electromagnetic radiation under the correction of the functional state of the blood oxygenation system in dogs of the experimental group I has a significant effect on the hemoglobin content in the blood of dogs only in 5 days after the start of correction — $\eta^2_x = 0.41$ ($p < 0.05$).

While as for the number of erythrocytes and the hematocrit index in the blood of these dogs, the reliable influence of electromagnetic radiation during the entire period of research has not been established ($\eta^2_x = 0.00$–0.07).

In animals with a low functional state of the blood oxygen transport system (experimental group III), the bioresonance method of correction is significantly more effective than in animals in of the experimental group I. Thus, just in two days after the beginning of the correction, the reliable influence of electromagnetic radiation on the hemoglobin content in the blood of dogs was established — $\eta^2_x = 0.45$ ($p < 0.05$). Five days after the start of the correction, the effect on the hemoglobin content only increases ($\eta^2_x = 0.81$; $p < 0.001$) and there is a significant effect of ultra low frequency electromagnetic radiation on the number of erythrocytes ($\eta^2_x = 0.86$; $p < 0.001$) and the hematocrit index ($\eta^2_x = 0.80$; $p < 0.001$) in the blood of dogs of the third experimental group (Fig. 1).

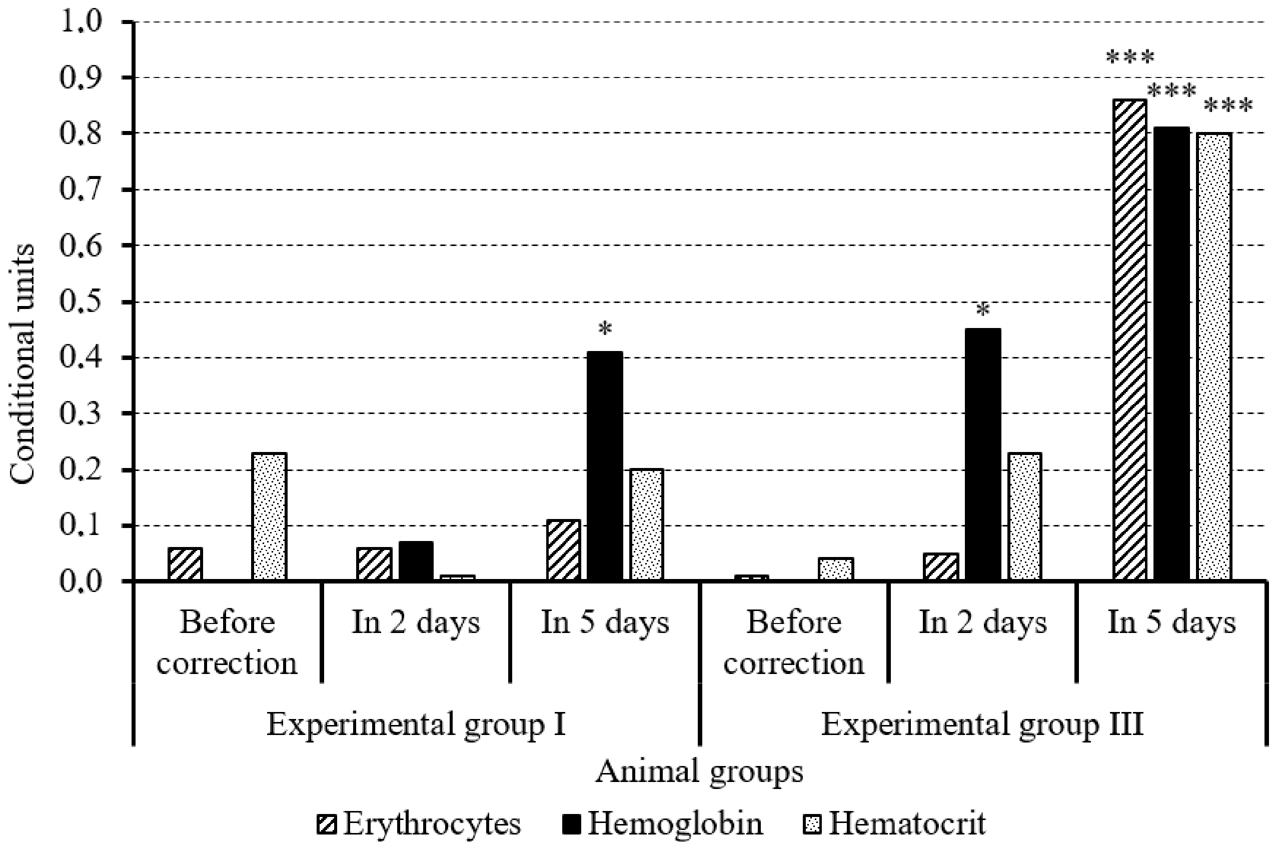

Figure 1. Influence of low-frequency electromagnetic radiation on blood indexes of dogs (η^2_x; n = 10; indicators are reliable at: * — $p < 0.05$; ** — $p < 0.01$; *** — $p < 0.001$)

Before the correction of the functional state of the blood oxygenation system in dogs of the 3rd experimental group, the number of indices of red blood did not significantly differ from those of animals of the 2nd experimental group. Two days after the start of bioresonance correction in animals of the 3rd group, the average content and average concentration of hemoglobin in the erythrocyte increased by 2.0–3.2%, the average amount of erythrocytes — by 5.4% ($p < 0.05$) and the value of color index — by 5.8% ($p < 0.05$).

Due to this increase, the average amount of erythrocytes in these dogs' blood is increased by 7.6%, and the average content of hemoglobin in erythrocyte is more by 8.2–8.9% ($p < 0.01–0.001$) compared with the indices of animals of the experimental group II.

From the 2nd to the 5th day after the beginning of the correction of the functional state of the respiratory function of the blood of dogs by the bioresonance method, in animals of the experimental group III, the erythrocytic indices of the dog blood do not significantly change and do not significantly differ from the animals in the control group.

It should be noted that in 5 days after the beginning of the correction of the functional state of the oxygen transport system, the average hemoglobin content in the erythrocyte of the dogs of the experimental group III was 6.6% higher ($p < 0.05$), and the value of the color index was 5.8% higher than indicators of animals of the experimental group II at this stage of research.

In animals with a low functional state of the system of blood oxygenation (III experimental group), the bioresonance method of correction is accompanied by the formation after two days of reliable influence of electromagnetic radiation on the average content of hemoglobin in erythrocyte — $\eta^2_x = 0.82$ ($p < 0.001$).

Conclusions. Thus, the effectiveness of the bioresonance method of correction of the functional state of the blood oxygenation system in dogs has been established. In particular, in dogs with a low functional state an increase in the number of erythrocytes, hemoglobin content and the average content of hemoglobin in erythrocyte as compared to the animals in the control group, which allows using this method to improve the system of oxygenation of blood in dogs.

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