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Influence of Non-Hormonal Drugs on Hormonal Background and Biochemical Parameters of Blood

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ABSTRACT

Any impact on the body and the physiological processes occurring in the body affect, to varying degrees, the composition of the blood. When making a diagnosis and selecting therapeutic agents, it is especially important to timely and correctly conduct biochemical and hematological studies of blood parameters. When prescribing various drugs, including protein-mineral complexes and micro-and macroelements, it is especially important to understand what effect this or that drug will have on the body as a whole. In this scientific article, the influence of a non-hormonal complex, designed to correct the hormonal background of the body, was studied using the example of sheep. Animals of the experimental group daily, for 50 days, were given 5 ml of a preparation containing iodine with amylodextrin and were injected with 1.5 ml of E-selenium and 0.5 ml of a tissue preparation mixed with 1 ml of a 0.5% novocaine solution. At the end of the experiment, the dynamics of protein and carbohydrate-lipid metabolism in laboratory animals were studied. It has been established that the non-hormonal agents used do not hurt the body and contribute to a more optimal recovery of the body.

Keywords: Non-hormonal agents, Hormonal correction, Protein metabolism indicators, Carbohydrate-lipid metabolism indicators.

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INTRODUCTION

Blood, or rather its components, is the main indicator of metabolism in the body [1-3]. Moving through a network of vessels and capillaries, blood contacts the cells of all tissues and organs, thus providing the possibility of their nutrition and respiration, supplying them with the necessary enzymes, hormones, and other substances, without which the normal functioning of the body is impossible [4, 5]. Any impact on the body and the physiological

processes occurring in the body affect, to varying degrees, the composition of the blood. It is for this reason that, both in scientific research and in making a diagnosis, doctors often perform biochemical and hematological blood tests [6]. Such studies are especially important when making a diagnosis, selecting means of therapy, preventing pathologies, and studying the effect of various drugs on the body [7-9]. The information obtained during the performance of such studies allows us to more quickly and efficiently solve many problems and issues that arise in medicine.
In therapy aimed at correcting the hormonal background, many specialists intensively use various means, including non-hormonal ones: vitamin-mineral complexes, vitamins, micro-macroelements, etc. [10-13]. This stabilizes the state of the body, improves the quality and quantity of produced sperm in men, and improves the quality of eggs in women [14, 15].
However, few specialists seriously think about how exactly a drug or a complex of drugs affects the metabolic processes in the body, what happens to carbohydrate-lipid or protein-mineral metabolism, how quickly metabolic processes are activated, whether the means used have a hidden negative effect on organism [16-18].
In this scientific work, a study is made of the effect of taking similar non-hormonal drugs on biochemical blood parameters using the example of laboratory animals.

MATERIALS AND METHODS

The study of the effect of non-hormonal correction of the hormonal background on the biochemical parameters of the blood was carried out on laboratory animals.

The studies were carried out according to the "Rules of Laboratory Practice in the Russian Federation" (Order of the Ministry of Health of the Russian Federation No. 708n dated August 23, 2010). Animal experiments were carried out by the rules adopted by the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes [19].
Two similar groups of 25 young rams were selected for the study. The Rams were clinically healthy, of average weight and size, and aged 1.5 to 2.5 years. Animals of both groups were kept under the same conditions and on the same diet.
Animals of the experimental group daily, 50 days, with feed were given 5 ml of a preparation containing iodine with amylodextrin and, intramuscularly, were injected with 1.5 ml of E-selenium and a tissue preparation of 0.5 ml mixed with 1 ml of a 0.5% solution of novocaine. Animals of the control group were not prescribed or given any drugs. Blood samples were taken before the start of the study and at the end of the experiment.
To study physiological and biochemical changes in the body of laboratory animals, blood was taken from the vessels, in which the indicators of protein metabolism and carbohydrate-lipid metabolism were determined according to the standard method [20, 21].
To characterize the clinical state of the animals, body temperature was measured, pulse and respiration rates were determined, and the state of health and behavior were monitored.

RESULTS AND DISCUSSION

The results obtained were statistically processed and summarized in **Tables 1 and 2**.

Table 1. Indicators of protein metabolism in rams.

Indicator	Standard	Groups	Numerical value	
			At the beginning of the experience	At the beginning of the experience
Total protein, g/l	42-97	Experience	20.37 ± 0.67	43.59 ± 5.80
		Control	28.11 ± 2.30	54.18 ± 13.75
Albumins, g/l	22.6-40.4	Experience	17.02 ± 1.20	20.13 ± 2.03
		Control	24.77 ± 3.19	23.23 ± 0.22
Globulins, g/l	35-49	Experience	3.35 ± 1.26	23.46 ± 7.84
		Control	3.34 ± 0.89	30.96 ± 13.53
Creatinine, mmol/l	53-174	Experience	154.41 ± 57.22	169.27 ± 22.57
		Control	181.33 ± 58.14	194.04 ± 49.45

Urea, mmol/l	3.3-9.3	Experience	4.02 ± 0.91	5.103 ± 1.66
		Control	2.75 ± 0.23	3.24 ± 0.65

In the course of the research, it was found that at the beginning of the experiment, hypoproteinemia, hypoalbuminemia, and hypoglobulinemia were observed in animals of both groups. At the same time, the level of creatinine and urea at the beginning of the experiment was almost normal. This is a sign that at the beginning of the experiment, the diet of the animals was not sufficiently balanced for some time, therefore, first of all, the diet was corrected and only then the experiment was carried out [22].

By the end of the experiment, the level of protein, albumin, and globulin in both groups changed significantly. So in both groups, the level of total protein was normal, but in the experimental group, the protein by the end of the experiment increased by 21.24% more than in the control. At the same time, the total protein concentration in the experimental group by the end of the experiment was 43.59 g/l, and in the control group, it was 54.18 g/l. Such dynamics can be explained only by the fact that the level of creatinine and urea also increased [23]. Consequently, in the rams of the experimental group during the period of the experiment, there was a more rapid recovery of the body after the correction of the diet.

Albumin in the experimental group increased by 17%, while in the control group, it decreased by 5.8%. At the same time, by the end of the experiment in both groups, the share of finely dispersed proteins - albumins accounted for about 50% of the total protein, which indicates good tissue hydrophilicity. At the same time, the level of globulins increased, which can be explained by an increase in the ability of the organism to a specific humoral response [24]. However, in the experimental group, the level of globulins increased by 31% less than in the control group. Consequently, in the experimental group there was less need for the formation of immune globulins, which can only be explained by the fact that in the process of experimenting, the body received the necessary trace elements that improve immunity (E-selenium and iodine).

Creatinine is a breakdown product of creatinine phosphate in muscles in the cycle of providing the body with energy for muscle contraction [25]. Given that the amount of produced creatinine is inextricably linked with the total body weight, in particular with muscle mass, we believe that the dynamics of creatinine concentration in our study showed the rate of recovery of muscle mass after the winter keeping of rams in barns. In the rams of the experimental group, the level of creatinine increased by 8.77%, and in the control group by 6.55%. Consequently, the restoration of muscle mass occurred more intensively in the animals of the experimental group.

Urea is one of the main indicators of the process of protein hydrolysis in the body [26]. The results of biochemical studies show that the concentration of urea in the experimental group at the beginning of the experiment is higher than in the control group, where the urea level is slightly below the minimum value of the norm. The high concentration of urea in the blood serum of rams of the experimental group indicates a high disintegration of feed protein [27]. Thus, it can be seen that in the rumen of rams, good hydrolysis of vegetable protein to amino acids occurs with further deamination of the protein to ammonia. By the end of the experiment in both groups, the level of urea increased, as there was an improvement in the cicatricial hydrolysis of feed proteins, which indicates an improvement in feed conversion. At the same time, feed conversion was better in the experimental group, where the urea level increased by 26%, while in the control by 17.8%.

Table 2. Indicators of carbohydrate-lipid metabolism in rams.

Indicator	Standard	Groups	Numerical value	
			At the beginning of the experience	At the end of the experience
Glucose, mmol/l	2.5-3.3	Experience	3.13 ± 0.43	4.52 ± 1.12
		Control	3.6 ± 0.69	4.715 ± 0.55
Triglycerides, mmol/l	0.66-0.88	Experience	0.29 ± 0.16	1.59 ± 0.93

		Control	0.087 ± 0.0017	0.77 ± 0.16
Cholesterol, mmol/l	1.1-2.3	Experience	0.78 ± 0.113	1.91 ± 0.07
		Control	0.28 ± 0.103	2.05 ± 0.27

Carbohydrate metabolism was studied by the dynamics of glucose in blood serum. At the beginning of the experiment, the glucose level was within normal limits. However, in the control group, it was slightly above the upper limit of normal. During the experiment, the glucose content increased in both groups, but in the experimental group, this figure increased by 13% more than in the control group. As for the level of triglycerides, as one of the indicators of lipid metabolism, it can be seen that at the beginning of the experiment, the level of triglycerides was below the lower limit of normal in both groups [28]. This can be explained by the fact that the animals received an unbalanced diet in the winter. After the correction of the diet during the experiment, the level of triglycerides was restored to physiological norms. At the same time, in the experimental group, the level of triglycerides after recovery was 1.6 times lower compared to the level of recovery in the control group. Triglycerides enter the body not only with feed but are also synthesized in the liver from carbohydrates. In the experimental group, the glucose level is higher than in the control, therefore, such indicators of triglycerides and glucose in the experimental group can also be explained by the fact that in the experimental group, there was a lower utilization of glucose for the formation of triglycerides. Such dynamics can be explained by the fact that the organisms of animals in the experimental group recovered more quickly by the end of the experiment. The same fact confirms the level of cholesterol, a source of lipids for lipid membranes during the formation of cells, in particular, the lipid membrane of spermatozoa [29]. So, in the experimental group, the cholesterol level at the beginning of the experiment was low in both groups, during the experiment it increased several times and by the end of the experiment was about 2 mmol/l in both groups [30]. It can be seen that in the experimental group, by the end of the experiment, the degree of cholesterol recovery was normal but 2.98 times lower than in the control. Such dynamics can be explained precisely by the fact that for the synthesis of cell walls, lipids were primarily utilized by the body of rams of the experimental group, while triglycerides were used for other metabolic processes. It should be noted that in the experimental group, all processes in the body of rams during their preparation for the breeding period proceeded more quickly and with less stress for the immune system.

CONCLUSION

In this scientific article, the influence of a non-hormonal complex, designed to correct the hormonal background of the body, was studied using the example of sheep. Animals of the experimental group daily, for 50 days, were given 5 ml of a preparation containing iodine with amylodextrin and were injected with 1.5 ml of E-selenium and 0.5 ml of a tissue preparation mixed with 1 ml of a 0.5% novocaine solution. At the end of the experiment, the dynamics of protein and carbohydrate-lipid metabolism in laboratory animals were studied. It has been established that the non-hormonal agents used do not hurt the body and contribute to a more optimal recovery of the body.

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ETHICS STATEMENT: The protocol for experiments with animals complied with the

requirements of the European Convention for the protection of vertebrate animals used for experimental and other scientific purposes.

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