

Impact of Transverol preparation on morphochemical indices of blood in service dogs

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Abstract. Scientists from Russia and other countries have researched the feeding dogs with prefabricated dry food for a long time. The experience of prefabricated food using shows that often their quality is low and they have negative impact on dogs' state of health. The food biologically active additives of vegetable origin are widespread in veterinary for digestion and nutrient absorption improvement and also for correction and normalization of metabolism. The research on impact of biologically active additive Transverol on morphological and biochemical blood composition in service dogs has been conducted. It was established that biologically active additive under study corrects hematopoiesis promoting metabolic processes acceleration in dog's body.

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Introduction

For normal activity during carrying out particular work service dog needs additional nutrients in comparison with not service dog. These nutrients should be taken into consideration during feeding diet composition. The dog's muscular work causes increase in energy, proteins, lipids, carbohydrates, mineral substances and vitamins consumption. The normal feeding dogs in combination with right keeping and dietary regime give them health, high reproductive function, efficiency and longevity [1, 2, 3].

It is not enough to know only organism's morphological features for characterization organism state in whole. Its functional and biochemical features should be also considered. So hematologic blood analysis is one of the most important diagnostic methods revealing response of hematopoietic organs to influence upon organism of various physiological and pathological factors [4, 5].

Blood is a liquid tissue carrying out the transport of chemical substances including oxygen and the integration of biochemical processes in different cells and intercellular spaces to unified system is the result of it. Besides, blood has protective, regulatory, thermoregulatory and other functions [6, 7, 8, 9, 10, 11].

Blood reflects morphological and functional deformities in organs engaged in processes of hematopoiesis and blood destruction and also regulation disturbance of these organs caused by direct action of various damaging factors. So our research was aimed to study impact of biological active additive Transverol on morphological blood composition in service dogs.

Methods

The experiments on 20 service dogs of German shepherd breed were carried out to achieve this goal. The dogs were divided into 2 groups based on analogues principle: control and experimental (10 animals in each).

We fed the animals from experimental group with equally balanced on composition of vitamins, macro and microelements dry feed Royal canin for dogs with high live weight. But dogs from experimental group got biologically active additive Transverol at a dose of 1 capsule during morning feeding. The duration of intake was 1 month.

The trans-resveratrol and quercetin are parts of biologically active additive Transverol. They prevent cardiovascular diseases and their complications development as well as premature body aging.

The blood draws from subcutaneous shoulder vein carried out to study impact of Transverol on hematologic indices. The number of hemoglobin, erythrocytes, leucocytes and also leukogram was calculated. The number of hemoglobin was calculated with hemoglobine cyanide method, of erythrocytes and leucocytes – in Goriaev's counting cell. In coloured blood smear the number of individual types of leucocytes was counted with further getting leucocytal profile. The contents of crude protein, urea, calcium, phosphorus, creatinine, glucose, etc. were defined in blood serum based on generally adopted methods. The results obtained were processed by means of variation statistics method of E.K. Merkurieva in Microsoft Excel programme.

Main part

Research on morphological blood composition in service dogs till their getting Transverol showed that the number of erythrocytes, leucocytes, hemoglobin and percentage ratio of leucocytes in animals of both groups had no significance difference and was at the same level (Table 1).

Table 1. Morphologic blood indices in service dogs

Index	Research dates			
	At the beginning of the experiment		At the end of the experiment	
	Control group	Experimental group	Control group	Experimental group
Hemoglobin, g/l	155.43±1.14	161.17±2.55	170.33±2.14	181.67±2.40*
Erythrocytes, 10 ¹² /l	7.87±0.37	7.90±0.29	7.04±0.26	8.86±0.31*
Leucocytes, 10 ⁹ /l	8.92±1.14	9.64±1.32	9.83±2.15	8.18±1.15
Leukogram, %				
Stab	3.57±1.36	3.86±1.68	2.00±1.65	4.12±1.08
Neutrophils				
Segmented	45.86±1.74	47.14±1.49	41.67±1.67	48.33±0.41
Lymphocytes	35.43±1.73	36.29±1.19	37.33±1.67	34.67±1.33
Monocytes	2.57±1.21	3.14±0.99	3.33±0.30	5.00±0.25**

Note: -*P<0.05; **- P<0.01

During hematologic indices analysis it was established that the number of hemoglobin in dogs of experimental group has trend towards increase in comparison with dogs from control one up to 11.34 g/l or 6.7% (P<0.05).

The number of erythrocytes in experimental animals' blood at the beginning of the experiment was in a range from 7.87 till 7.90 × 10¹²/l. When Transverol was added to diet the number of erythrocytes in dogs from experimental group was higher than in dogs from control one up to 1.82 × 10¹²/l or 25.9% (P<0.05). This fact demonstrates the extra oxygen delivery in blood and, consequently, the metabolic processes acceleration in organism. During our research we established that the number of leucocytes, stab and segmented neutrophils and lymphocytes in the environment under study had no significance difference between groups at the end of the experiment. At the end of the experiment the leucocytes contents in dogs from control group was higher than in dogs from experimental one and it was 9.83±2.15 × 10⁹/l. The percentage ratio of stab neutrophils in dogs from experimental group was at the high level and it was 4.12±1.08%. The percentage ratio of segmented neutrophils in dogs from both groups was within the limits of physiological norm.

The difference between groups on hemoglobin, erythrocytes and monocytes contents in blood was significant. The monocytes contents in dogs from experimental group was 5.00±0.25 % (P<0.01) and it is higher up to 1.67 % than in dogs from control group.

Thus, during the research it was found that Transverol has corrective impact on hematopoiesis, so it promotes service dogs' health keeping.

It was established during the conducted study that feeding dogs from experimental group with biologically active additive Transverol has an influence on some biochemical blood serum indices. Analyzing biochemical blood indices of animals under the study it should be noted that animals from both groups had no significant differences by all blood serum indices under the study before feeding Transverol. These indices were at the same level (Table 2).

Based on blood indices the protein changes are defined. The deviations from physiological normality identify the protein nutrition disorders. The crude protein indices in animals from both groups at the beginning of the experiment were within the limits of physiological norm and were 62.36 – 65.59 g/l. At the end of the experiment it was established that crude protein contents in blood serum in animals from experimental group had trend to increase in comparison with analogues from control one up to 6.54 g/l or 9.4 % (P<0.05).

Table 2. Biochemical blood indices in animals under the study

Index	Research dates			
	At the beginning of the experiment		At the end of the experiment	
	Control group	Experimental group	Control group	Experimental group
Crude protein, g/l	62.36±2.94	65.59±1.79	69.83±1.00	76.37±2.38*
Urea, mmol/l	7.43±0.86	7.65±0.60	7.12±0.47	6.79±0.70
Glucose, mmol/l	3.77±0.27	3.70±0.20	4.84±0.37	3.41±0.14
Calcium, mmol/l	2.70±0.08	2.67±0.06	2.71±0.10	2.86±0.06
Phosphorus, mmol/l	1.41±0.09	1.52±0.08	1.52±0.13	1.52±0.12
Creatinine, mmol/l	106.29±5.80	111.57±2.88	95.67±10.09	91.67±5.81
ALT/SGPT, u/l	44.86±4.37	48.43±6.97	52.67±9.21	43.67±3.28
AST/SGOT, u/l	39.00±3.12	44.14±4.78	52.33±5.55	41.33±1.67
Thymol test, unit	2.09±0.35	2.37±0.43	3.00±0.43	2.41±0.17
Cortisol, nmol/l	47.10±0.34	50.73±0.27	43.83±0.28	32.39±0.61
Bilirubin, mmol/l	2.74±0.07	2.73±0.17	2.73±0.07	2.57±0.09

Note: -*P<0.05

The blood sugar level in dogs from experimental group at the end of the experiment decreased in comparison with dogs from control one and was 3.41 mmol/l. Due to this fact the antioxidant function was increased and the functional state of dogs tended toward hyperglycemia was improved.

The calcium and phosphorus contents level in blood serum is indicator of mineral metabolism state. It should be noted that feeding experimental group dogs with biologically active additive Transverol had no significant impact on calcium and phosphorus contents in blood serum.

The aspartate aminotransferase (AST) and alanine aminotransferase (ALT) were selected among enzymes as objects for research on liver function changes. These enzymes are the main enzymes characterizing the pathological processes in myocardium and liver, as well as thymol test as a specific liver enzyme.

The excess release of these enzymes in blood indicates the inflammatory processes in liver. At the end of the experiment the decrease in activity of ALT was defined in dogs from experimental group compared with dogs from control one by 17.09% and also the tendency toward decrease in activity of AST by 21.02% was observed. This fact indicates that there is no any toxic action of biologically active additive Transverol on dog's organism and even its positive impact on liver and heart function.

The stress resistance of animal is defined based on cortisol (the main adrenocortical hormone) concentration. The reduced contents of cortisol in dogs from experimental group evidence animals stress resistance increasing.

The bilirubin is the main bile pigment of mammals and also the final product of hemoglobin disintegration. The liver function and hematopoiesis can be determined by bilirubin indices. At the end of the experiment the decrease in total bilirubin in blood in dogs from experimental group by 5.86% in comparison with dogs from control one was observed.

Summary

Thus, based on obtained data we can conclude that biologically active additive Transverol has a significant impact on function of organs of the digestive system such as liver and pancreas and also on carbohydrate metabolism in service dogs' organism.

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