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## **РЕЗЮМЕТА НА НАУЧНИТЕ ТРУДОВЕ СЛЕД ПЪРВА ХАБИЛИТАЦИЯ**

**39. Гундашева, Д.** 2017. Физическо натоварване и ваксинация при спортни коне – хомеостатични отговори и механизми, *дисертация* за присъждане на научна степен „доктор на науките“.

**39А. Гундашева, Д.** 2017. Физическо натоварване и ваксинация при спортни коне – хомеостатични отговори и механизми, *автореферат на дисертация* за присъждане на научна степен „доктор на науките“.

(abstract)

The study of the effects of physical exercise on cellular and humoral immunity factors has recently attracted considerable attention worldwide. However, there are some aspects, such as the combined action of physical exercise and vaccination, or only vaccination, which have not been thoroughly examined yet. They deal with numerous features related to the behavior of non-specific and specific defense mechanisms, as well as to certain other responses in the hormonal background. The study also focuses on the erythron, and various biochemical and clinical indicators, which haven't been studied during the administration of combined physical exercise and vaccination, or uniquely vaccination.

We vaccinated sports horses against EHV 4/1 and EIV and subjected them to physical exercise on the 14th day after vaccination four consecutive days. We have used a complex approach in evaluating their non-specific defense mechanisms to study a combination of indicators of innate defense. We have found that on the first day after exercise (relevant to the 18th day after vaccination) there was a slight acute-phase response (increased ESR and fibrinogen values, but within the reference ranges; increase of CPCA (2nd day), whereas the other indicators of this response reacted by decreasing the concentration of lysozyme and the activity of APCA (1st day). Another decrease, yet within the reference ranges, was observed in  $\alpha_2$ -globulins (2nd day). From the first to the 11th day after exercise different time changes were found, such as: increase of the total globulins and  $\gamma$ -globulins, leukopenia with a decrease in segmented neutrophils and left deviation; hypoalbuminemia, decreased concentration of lysozyme, increased activity of APCA and CPCA. These changes indicated the presence of a certain alteration which created an environment favorable for the production of specific antibodies for vaccine antigens.

Indeed, on day 4 and day 11 (relevant to day 21 and 28 after vaccination) high levels of antibodies were registered in the blood serum. They resembled the increase in the levels in vaccinated, but non-trained horses.

The combined action of physical exercise and vaccination, however, affected the erythron, especially on 0 hour – the increased level in the number of erythrocytes and haematocrit, hyperchromemia and panting were compensatory mechanisms, intended to provide the increased need for oxygen to skeletal muscles.

The metabolic response was influenced, especially during the first 24 hours after exercise. Hyperpyruvemia with hyperlactatemia were registered after 0 hour, which proved the presence of increased glycogenolysis, and glycolysis. The analysis of reliably increased select biochemical indicators (creatine kinase, ASAT, ALAT, triacylglycerols, total cholesterol and creatinine), despite being within the reference ranges, showed the organ reaction (skeletal muscles and kidneys), and the type of energy metabolism, which were related to physical exercise. Changes in the electrolyte response were best seen in relation to calcium – decrease in the total calcium levels (2nd day), and an increase of ionized calcium (1st day). As for the hypercalcemia, it was apparently a result of hypoalbuminemia (extremely high negative correlation between iCa and albumin: ( $p=-0.941$ ,  $r=0.005$ )). The use of the complex approach in the analysis of the changes in acid-base balance showed that on 0 hour there was a compensated metabolic acidosis, associated with high lactate concentration, reliably decreased potassium (within the reference ranges), unchanged chloride concentration, activated protein buffer system (slightly increased level of  $A^-$  and increased haemoglobin), panting, resp. hyperventilation (tendency to  $pCO_2$  decrease and  $pO_2$  increase), and slightly changed kidney function (slightly increased creatinine within the reference ranges). Furthermore, the positive correlation between  $pCO_2$  and APCA, and between  $HCO_3^-$  and APCA proved the relationship between the changes in the acid-base balance and the innate defense mechanisms.

Therefore, our results led to the conclusion that sports horses after vaccination could be trained, because such type of physical exercise (barrier jumping) did not suppress the production of virus neutralizing antibodies against vaccine antigens (EHV4/1, EIV-A1 and EIV-A2). Even though it led to numerous homeostatic changes, directed mainly to adaptation of the organism to the applied influences, these changes did not affect the specific immune response.

We have also studied the single effect of the vaccine on horses in its early stage (from the 14th day). The data showed that between the 24th and the 72nd hour it induced a slight acute-phase response (increased ESR, increased  $\alpha_1$ -globulins, increased CPAC activity, slight increase within the reference ranges of haptoglobin). Between the 7th and the 14th day after vaccination, a reduction of leucocytes, lysozyme and APCA were observed, as a result of the logical switching of non-specific immune response to specific immune response, occurring with an increase of virus neutralizing antibodies on the 14th and 21st day. The metabolic and electrolytic responses were slightly influenced – the changes in glucose, pyruvate and lactate, as well as in the enzymes ASAT and ALAT, and the electrolytes sodium, potassium, total calcium and ionized calcium varied within the physiological ranges. No fever or side effects were observed. These data show that the administered vaccination has no negative effects on the homeostasis of the horse organism.

**40. Goundasheva, D., L. Sotirov, I. Chenchev, T. Karadjov, G. Bursev.** Influence of booster vaccination against influenza and equine herpes virus 4/1 on some parameters the immune response in horses. *Revue de Medicine Veterinaire*, 2002, 153 (8-9), 569-574 (**Импакт фактор 0.170**)

## SUMMARY

This study aimed to find whether some factors of innate (lysozyme activity, alternative pathway of complement activation - APCA, total and differential WBC counts) and acquired (serum antibody response) immunity would change after implementing a booster vaccination with oily adjuvated



inactivated vaccine against influenza and equine herpes virus 4/1. Six healthy vaccinated horses were used. They were revaccinated and another three used as controls (not vaccinated). The results showed that after an early booster vaccination (up to the 14th day) there were no significant changes in lysozyme activity and APCA. However, a significant reduction in lysozyme on the 21st day and tendency towards decrease in complement activity were detected on the 14th and 21st day, which corresponded to the increase in the A1 and A2 equine influenza virus antibodies and EHV-1 virus neutralizing antibodies and especially in the EHV- 4 ones meaning that those non-specific factors were greatly limited as protective agents. A significant decrease in the segmented neutrophils percentage, accompanied by an increase in the lymphocyte percentage, was detected within 7-14 days after the booster vaccination, which indicated a process of immuno-biological transformation in the body. The changes in lysozyme activity, APCA, the antibody response and the leucocyte counts could serve as indices for the development of the post vaccinal period.

**KEY-WORDS :** horse - booster vaccination - lysozyme - complement - antibodies - leucocytes.

**41. Sotirov L., D. Gundasheva, P. Dzhelebov.** Lysozyme and complement response to exercise in horses with booster vaccination against influenza virus and equine herpes virus 4/1. *Revue de Medecine Veterinaire*, 2004, 155 (8-9), 449-452. (Импакт фактор 0.122).

#### SUMMARY

The aim of this study was to determine the influence of exercise on innate immunity factors, complement response and lysozyme, during booster vaccination against Influenza virus and Equine herpes virus 4/1 in horses. Twelve healthy Hannover horses (4-9 year old) were subjected to booster vaccination and 6 of them (assay group) were submitted to exercises (jumping hurdles on four consecutive days). Regular exercises during the period of vaccinal antibody production did not significantly change lysozyme concentrations, but on the contrary improved the intensity of classical pathway of complement activation (CPCA) on the 2nd day after exercise (19th day post vaccination) and induced sustained increases of alternative pathway complement activation (APCA) within the 4th and the 11th days after exercise (21st - 28th days post vaccination). These results show that exercise has no negative effect on innate immunity factors (lysozyme, APCA and CPCA) and by contrast, could promote the vaccinal response by increasing complement activation.

**KEY-WORDS :** horse, booster vaccination, lysozyme, complement

**42. Gundasheva D., I. Chenchev, R. Katsarova, T. Karadjov, I. Tsachev, G. Barsev.** Changes in leucocyte and antibody response following exercise in horses with booster vaccination against influenza and equine herpes virus 4/1. *Revue de Medecine Veterinaire*, 2005, 156 (11), 527-532. (Импакт фактор 0.170).

#### SUMMARY

The aim of the study was to investigate the influence of strenuous repeated exercise applied during the effector phase of the immune response (14 days after booster vaccination) upon several parameters of the innate and specific immune responses. Twelve healthy Hannoverian horses were revaccinated against influenza virus (IV) and equine herpes viruses types 1 and 4 (EHV1/4) and

divided into 2 equal groups. In experimental group horses were besides submitted to repeated exercise (jumping for 4 consecutive days) beginning at the 14th day post revaccination, whereas control horses were only revaccinated. The exercise, combined to revaccination, resulted to significantly increase the counts of band neutrophils on the 1st day after exercise and to induce monocytosis and eosinopenia 2 hours after the end of the exercise. Neither the specific immune response against influenza virus types A1 and A2 nor the antibody response against EHV-1 and EHV-4 were reduced, evidencing that the applied exercise did not influence the immune response magnitude against vaccinal antigens.

**Keywords :** horse - booster vaccination - exercise - antibodies - leukocytes.

43. Гундашева Д., Р. Кацарова. Влияние на физическото натоварване на коне върху тиреоидните хормони, телесната температура и електролитите натрий и калий.  
*Trakia Journal of Sciences*, 2008, 6 (2), Suppl. 3, 239-242.

#### ABSTRACT

The aim of the current research was to study the influence of strenuous physical exercise over thyroid hormones, rectal temperature, sodium (Na) and potassium (K) in blood. The thyroid hormones were determined using direct chemiluminiscent technology whereas serum sodium and potassium concentration were measured spectrophotometrically. Six untrained healthy Hanoverian breed stallions were exercised for four consecutive days in conditions similar to those of a competition. The applied physical exercise led to an increase in TSH and T-3 concentration levels right after (0 hour) it had been carried out. Higher temperature levels from day 1 to day 4 of the procedure hypernatremia and hypokalemia were also observed.

**Key words:** physical exercise, thyroid hormones, body temperature, electrolyte, horses

44. Gundasheva D., T. Georgieva. Influence of physical exercise on the total calcium, albumin and total protein levels in horses with booster vaccination against influenza and equine herpes virus 4/1. *Trakia Journal of Sciences*, 2012, 10, Suppl.1, 348-352.

#### ABSTRACT

This study aim to determine whether strenuous physical exercise applied to horses during booster vaccination will lead to changes in the serum concentration of total calcium, albumin and total protein levels.

Twelve male horses revaccinated against equine influenza virus (EIV) and equine herpes virus (EHV4/1) were used. Six of them were subjected to physical exercise (experimental group) for four consecutive days in condition similar to those during competition, whereas six other formed a control group. Blood samples were taken from their *v. jugularis externa*. The above mentioned indices were found in the produced serum.

The applied physical exercise together with the booster vaccination led to a statistically significant decrease of the total calcium concentrations on day 2 and 4 compared to the control group. The exercise induced an increase in the protein concentrations on the 0 hour and on day 1, and a raise in



the albumin levels on the 0 hour after the initial stage. As for the control groups, an increase in the albumin concentrations were detected on the 0 hour. A decrease in the total protein levels was found from day 2 to day 11, whereas albumin concentrations – on day 2 and 11 after onset.

**Key words:** total calcium, albumin, total protein, horse, exercise, booster vaccination

45. Гундашева Д, Т. Георгиева. Влияние ревакцинации против инфлюэнцавируса и герпесвируса 4/1 на некоторые острофазные белки у лошадей. *Науковий вісник Національного університету біоресурсів і природокористування .України*. Київ-2012, 172, 3, 71-78. ISSN: 2222-8608.

Представлены результаты изучения острофазных белков – гаптоглобина, фибриногена и альбумина после применения ревакцинации против инфлюэнцавируса и герпесвируса 4/1 у лошадей. Они показывают, что на раннем этапе (до 72-го часа) после ревакцинации не наблюдаются изменения плазменных концентрации этих белков вне референтного охвата. Гаптоглобин, фибриноген и альбумин могут быть использованы в качестве неспецифических показателей состояния здоровья лошадей после введения вакцин.

*Гаптоглобин, фибриноген, альбумин, ревакцинация, инфлюэнцавирус, герпесвирус лошадей.*

46. Gundasheva D., K. Kostov, E. Dishlyanova. Effects of physical exercise on blood glucose and glycolysis-associated metabolite levels in revaccinated horses. *Bulgarian Journal of Veterinary Medicine*. 2013, 16, Suppl. 1, 54-61 (SJR = 0.136).

This study focuses on the effects of physical exercise on blood concentrations of glucose pyruvate and lactate in horses revaccinated against EIV and EHV 4/1. The horses were divided into two groups: a control group including only revaccinated horses (n=6) and an experimental group with revaccinated and subjected to physical exercise animals (n=6). Horses were trained intensively, in conditions resembling competition for four consecutive days. Glucose levels were determined with a UV enzyme test. Lactate and pyruvate values were detected by a colorimetric method. An increasing trend in glucose concentrations in experimental horses was marked on hours 0 and 2. A statistically significant increase of pyruvate, lactate and lactate-pyruvate ratio was found on hour 0 and 2 hour for the pyruvate, and on hour 24 for the lactate-pyruvate ratio. These finding indicate that anaerobic metabolic pathways are included for fast use in physically exercised horses. We therefore conclude that carbohydrates are an important energy source for physically trained horses and that lactate pyruvate and lactate-pyruvate ratio may be used to determine the symptomatic intensity of physical exercise. Immunization of horses against EIV and EHV 4/1 has an insignificant effect on the studies biochemical parameters except for pyruvate.

**Key words:** exercise, glucose, lactate, horses, pyruvate, revaccination

47. Гундашева Д, Л. Сотиров. Влияние метаболического ацидоза на некоторые показатели неспецифического иммунного ответа у лошадей. *Актуальные вопросы ветеринарной биологии*. 2013, 17 (1), 6-9. (Импакт фактор 0.320).

**Аннотация.** Физическая нагрузка, которой были подвергнуты лошади в течение четырех дней, вызывает компенсаторный метаболический ацидоз. Этот ацидоз не оказывает влияния на гемолитическую активность классического пути активации комплемента. Через два часа после окончания нагрузок компенсаторный метаболический ацидоз в меньшей степени отрицательно влияет на активность лизоцима и в большей – на альтернативный путь активации комплемента. Снижение активности этих гуморальных факторов неспецифического иммунитета может сделать организм лошади более уязвимым к инфекции сразу же после физических нагрузок.

**48. Gundasheva D.** Electrophoretic analysis of serum proteins in strenuously trained horses revaccinated against equine herpes virus 4/1 and equine influenza virus. *Veterinarija ir zootechnika*. 2015, 69, (91), 18-25. (SJR=0.183).

#### **Abstract**

The objective of the current paper was to study the impact of physical exercise on electrophoretic migrational profile of serum protein fractions in horses revaccinated against equine herpes virus 4/1 (EHV 4/1) and equine influenza virus (EIV). 15 healthy stallions Hannover breed were used and separated into three groups – group A (3 non-vaccinated horses), group B (6 revaccinated horses) and group C (6 revaccinated and submitted to physical exercise horses). Group C horses performed barrier jumping for 4 consecutive days, beginning from day 14 following revaccination.

In Group A horses there were no statistically significant changes in the studied serum protein fractions. Group B revaccinated horses showed a decrease in concentrations of  $\alpha_1$ ,  $\alpha_2$ - и  $\beta_1$ -globulins on day 4 (relevant to day 21 after revaccination), but within the range of their referential values. The concentration of the  $\beta_2$ -globulin subfraction remained unchanged. These results show that during the study period (from day 14 to day 28 after vaccine administration) no inflammatory response was noted. The concentration of total globulins and  $\gamma$ -globulins above the referential range was increased on day 1 (relevant to day 18 after revaccination), which means that the immune response was stimulated.

Compared to B group horses, the combined action of the revaccination and the physical exercise of group C horses led to statistically important higher values in the concentrations of  $\beta_1$ -globulins on 2 hour and day 4, and to lower levels of  $\beta_2$ -globulins on 2 hour after physical exercise, but within referential intervals. Total globulin concentrations throughout the study period (except on day 4) and of  $\gamma$ -globulins on day 1 after physical exercise is above their referential intervals. A:G ratio is reduced on day 1 and increased on day 4 after physical exercise, which is a result of changes mainly in total globulins.

The results obtained from this research show that the applied physical exercise of horses revaccinated against EHV 4/1 and EIV has a modifying effect on serum proteins, without suppressing the protective function of  $\gamma$ -globulins. This is important when assessing the health condition of revaccinated horses during training and parcourt competitions.

**Key words:** Electrophoresis, horses, physical exercise, revaccination

**49. Gundasheva D., T. Georgieva.** Changes in some acute phase response parameters after physical exercise in horses with booster vaccination against equine herpes



virus 4/1 and equine influenza virus. *Veterinarija ir zootechnika*. 2015, 70 (92), 22-28.

(SJ<sub>R</sub>=0.183).

## ABSTRACT

The purpose of the present study was to investigate the effect of physical exercise on acute phase proteins in horses, vaccinated against equine herpes virus 4/1 and equine influenza virus through easily available and efficient equine pathology biomarkers such as haptoglobin, fibrinogen and erythrocyte sedimentation rate (ESR).

Fifteen healthy Hanoverian stallions, 4 to 9 years of age were divided into three groups – group A – control, including 3 non-vaccinated horses; group B – consisting of 6 revaccinated horses and group C – 6 revaccinated horses submitted to physical exercise (barrier jumping for 4 consecutive days, beginning from post revaccination day 14).

Blood plasma haptoglobin concentrations were assayed by the patented method of ReactivLab (Glasgow, Scotland). Plasma fibrinogen was assayed with a commercial Hemostat Fibrinogen coagulation kit. ESR was determined by the method of Westergren.

The results demonstrated variable effects of physical exercise on studied blood parameters. It lowered ESR on hour 0 and did not influence blood plasma haptoglobin throughout the experimental period. After one day, physical exercise produced a state accompanied by increased blood fibrinogen (within the reference range) and accelerated ESR.

The combination of ESR and blood fibrinogen levels could be useful for evaluation of physical exercise severity in horses during training and parcourt competitions, indicating an occurring disease activity in revaccinated animals.

**Key words:** acute phase response, equine vaccination, exercise influence

50. **Gundasheva D.**, I. Tsachev. Laboratory and field studies on acute phase response of horses after vaccination against equine influenza virus and equine herpes virus 4/1. *Trakia Journal of Sciences*, 2015, 13 (1), 88-92.

## ABSTRACT

**PURPOSE:** The purpose of the present study was to evaluate the effects of booster vaccination of horses with multivalent vaccine against equine herpes virus 4/1 and equine influenza virus (EIV) on some acute phase response indices – classical pathway of complement activation (CPCA), erythrocyte sedimentation rate (ESR) and some clinical parameters. **METHODS:** Nine Hanoverian geldings were divided into two groups: group A – 3 non-vaccinated animals and group B – 6 revaccinated animals. Horses from group B were vaccinated one year ago against EHV 4/1 and EIV. CPCA was assayed as per the method of Mayer, modified for horses and ESR – by the method of Westergren. Pulse rate (PR), respiratory rate (RR) and rectal temperature (RT) were also monitored throughout the 14-day experimental period. **RESULTS:** In horses from group B, a substantial increase in haemolytic activity of CPCA was established (24 -72 h), enhanced ESR (by the 72nd h), accelerated PR by the 24th h within the reference range, no statistically significant changes in RR and absence of fever. **CONCLUSIONS:** The changes in acute phase response parameters CPCA, ESR, PR, RR and RT after revaccination of horses could provide information for their health status with respect to their performance and participation in competitions.

**Key words:** horses, EHV4/1/EIV vaccine, booster vaccination, complement, ESR, clinical parameters

**51. Gundasheva D.** Effect of exercise on erythron, heart and respiratory rates in horses vaccinated against equine herpes virus 4/1 and equine influenza virus. *Comparative Clinical Pathology*. 2015, 24 (6), 1565-1572. (SJR=0.281).

## Abstract

Limited data are available for the influence of physical training in jumping horses at the background of booster vaccination. The aim of the study was to establish the effects of physical exercise applied at the background of booster vaccination against equine herpes virus 4/1 (EHV 4/1) and equine influenza virus (EIV) on changes in the erythron, breathing and pulse rates of horses. The differences were investigated between vaccinated and exercised horses and vaccinated-only controls. Fifteen Hanoverian geldings were distributed into 3 groups: group A, 3 non-vaccinated animals; group B, 6 vaccinated and group C, 6 vaccinated horses submitted to physical exercise. Horses from groups B and C were vaccinated 1 year ago against EHV 4/1 and EIV. Blood samples were evaluated for erythron parameters following standard procedures. The pulse and breathing rates were determined during the 14-day study period. The physical training of horses resulted in most substantial increase in red blood cell count, haemoglobin and haematocrit on post exercise hour 0, day 1 and day 11; all values were within the reference ranges except for haemoglobin on hour 0. The red blood cell indices MCV and MCH were not significantly altered vs initial level except for MCHC on day 2 and day 11. Pulse and breathing rates were enhanced on post exercise hours 0 and 2 vs initial level and groups A and B. The results are important for evaluation of training effects on aerobic potential enhancing the physical performance.

## Keywords

Horses, Exercise, Booster vaccination, Erythron, Clinical indices

**52. Gundasheva D.** Biochemical response to physical exercise in show-jumping horses. *Comparative Exercise Physiology*. 2016, 12 (1), 11-16. (Journal Impact 0.56).

## Abstract

The information on the biochemical response of horses submitted to physical exercise by jumping over obstacles is limited and controversial. The purpose of the present study was to monitor the change in activity of muscle enzymes creatine kinase (CK), aspartate aminotransferase (AST) and alanine aminotransferase (ALT), as well as the serum concentrations of triacylglycerols, cholesterol and creatinine in performance horses. Correlations between study parameters were also estimated. Six healthy Hanoverian geldings were submitted to physical exercise similar to a competition consisting of jumping over barriers over four consecutive days. The applied exercise induced increases of biochemical parameters CK, AST, ALT, triacylglycerols, total cholesterol and creatinine within the reference ranges. The changes in these parameters reflected the changes in skeletal muscle and kidney functions as well as alterations in the type of used energy. Negative correlations were established between CK and ALT at



2 hours, and between triacylglycerols and total cholesterol during the entire period of the study. Also, a positive association was established between CK and AST at 24 hours and between total cholesterol and creatinine before exercise, and at 0 and 2 hours post-exercise. The data from the present study could be utilised as guidelines for prevention and early detection of metabolic disturbances in show jumping horses.

**Keywords:** training, blood biochemistry, jumping horses

- 53. Gundasheva D.** Immune Response against Equine Influenza Virus and Equine Herpes Virus after Infection and after Vaccination in Horses. *Bulgarian Journal of Veterinary Medicine (Публикувана online)*, 2017. (SJ<sub>R</sub>2016 = 0.510).

#### Summary

The overview summarised data from contemporary studies on immune response against two of the most contagious respiratory diseases in horses – influenza and herpes viral infections. It goes over the generation of immune response in this animal species after vaccination against the viral antigens. The knowledge of mechanisms of immune system response to the infections and respective vaccinations are essential for equine health, particularly with regard to full recovery of their athletic performance.

**Key words:** EHV-1 and 4, horses, immune response, influenza A (H7N7 and H3N8), vaccination

- 54. Dzhelebov P., D. Gundasheva, M. Андонова, R. Mihailov, E. Slavov.** Effects of experimental prolonged strenuous exercise on haematological parameters in dogs. *Bulgarian Journal of Veterinary Medicine*, 2009, 12 (2), 112-118.

#### Summary

Six experimental male, mongrel dogs (1.5–3.5 years of age), were submitted to a prolonged strenuous exercise until exhaustion, in order to study its effects on some haematological parameters. The time course of haemoglobin concentration (Hb), red blood cells counts (RBC counts), haematocrit (Hct) and red blood cells indices were measured: before exercise, right after exercise (0 hour), on 2<sup>nd</sup> hour, 4<sup>th</sup> hour, 24<sup>th</sup> hour, 48<sup>th</sup> hour, 72<sup>nd</sup> hour, 7<sup>th</sup> day and 14<sup>th</sup> day after exercise. Hb and RBC counts decreased right after exercise, on 4<sup>th</sup> hour, 48<sup>th</sup> hour, 72<sup>nd</sup> hour, 7<sup>th</sup> day and 14<sup>th</sup> day after exercise. Hct decreased significantly on 48<sup>th</sup> hour and 72<sup>nd</sup> hour after exercise. Mean corpuscular haemoglobin (MCH) decreased statistically significantly right after exercise and on 48<sup>th</sup> hour. Mean corpuscular haemoglobin concentration (MCHC) decreased only right after exercise, while mean corpuscular volume (MCV) changed right after exercise and on 2<sup>nd</sup> and 24<sup>th</sup> hour.

**Key words:** dog, erythrocyte indices, erythrocytes, exercise, haematocrit, haemoglobin

- 55. Дзелебов П., Гундашева Д., М. Андонова, Е. Славов.** Общ белтък и албумин след продължително физическо натоварване при кучета. *International Science*

conference, 4<sup>th</sup>-5<sup>th</sup> June, 2009, Stara Zagora, Agricultural science. *Animal studies & Veterinary medicine*, vol. I, 182-185.

#### ABSTRACT

Six experimental male, mongrel dogs (1, 5 – 3, 5 years of age), were submitted to a prolonged strenuous exercise until exhaustion, in order to study its effects on serum concentration of total protein (TP) and albumin (A). TP and A were measured in the following dynamics: before exercise, right after exercise (0 hour) and on 2<sup>nd</sup> hour, 4<sup>th</sup> hour, 24<sup>th</sup> hour, 48<sup>th</sup> hour, 72<sup>nd</sup> hour, 7<sup>th</sup> day and 14<sup>th</sup> day after exercise. TP decreased after exercise – changes were statistically significant on 4<sup>th</sup> hour, 7<sup>th</sup> day and 14<sup>th</sup> day. On the contrary A increased, but increase was significant only right after exercise (0 hour). In control group there were no changes in the studied parameters.

*Key words: dog, exercise, total protein, albumin*

56. **Goundasheva, D., S. Sabev.** Influence of exercise on acid-base status, blood gas and electrolyte status in horses. *Trakia Journal of Sciences*. 2011, 9, (3), 63-67.

#### ABSTRACT

The aim of the present study was to explore the influence of the jumping exercise in Bulgarian sport horse over the acid-base status, blood gases and some electrolytes. Four horses at the beginning of their training period were tested. Blood samples were taken anaerobic from the jugular vein before and after exercises. The assessment of above mentioned parameters was performed by electrolyte analyzer (ABL 800, Basic, Electrolyte analyzer, Radiometer, Copenhagen, Denmark). It was found that applied physical exercise not cause statistical changes in indicators of acid-base and blood gas status. Increased hemoglobin concentration ( $p < 0.05$ ) and decreased concentration of ionized calcium ( $p < 0.01$ ) was found after exercise. There are no significant changes in the concentration of the electrolytes sodium potassium chlorine and ionized magnesium, anion gap (AG) and strong ion difference (SID).

57. Dzhelebov P., **D. Gundasheva**, M. Андонова, E. Slavov. Effects of exhaustive exercise on blood glucose, total, cholesterol, and triglycerides in canine experimental model. *Trakia Journal of Science*, 2012, 10, suppl. 3, 372-376.



## ABSTRACT

**BACKGROUND:** Exercise alters metabolism in different ways depending on exercise duration and intensity.

**OBJECTIVES:** The aim of this research was to determine the influence of exhaustive exercise on blood glucose, total cholesterol and triglycerides in canine experimental model.

**MATERIAL AND METHODS:** We used 12 male, mongrel dogs divided into two groups – animals from experimental group were submitted to aerobic exercise until complete exhaustion; animals from control group did no exercise. Serum glucose, total cholesterol (TC) and triglycerides (TG) levels were measured before exercise (BE), right after (0 hour) and on 2<sup>nd</sup>, 4<sup>th</sup>, 24<sup>th</sup>, 48<sup>th</sup> and 72<sup>nd</sup> hour, and on day 7<sup>th</sup> and 14<sup>th</sup> after exercise.

**RESULTS:** In experimental group, as compared to BE level, blood glucose decreased insignificantly on 0 hour and 2<sup>nd</sup> hour. Glucose levels in experimental group were significantly lower compared to controls on 0 hour after exercise ( $p < 0.05$ ). TC in experimental group did not change significantly after exercise, but compared to control group TC levels decreased on 4<sup>th</sup> hour after exercise ( $p < 0.05$ ). TG in experimental group increased significantly on 0 hour, both compared to BE level ( $p < 0.05$ ) and to controls ( $p < 0.01$ ).

**CONCLUSION:** Single bout of exhaustive exercise has short term influence on metabolism – mobilization of energy sources.

**Key words:** dog, blood glucose, total cholesterol, triglycerides, exercise

**58. Dzhelebov P., D. Gundasheva, M. Андонова, E. Slavov.** Total and differential leucocyte counts, globulins, and albumin/globulin ratio after exhaustive exercise in dogs. *Bulgarian Journal of Veterinary Medicine*, 2013, 16, Suppl. 1, 77-82.

(SJR = 0.136).

The aim of the experiment was to study the effect of exhaustive aerobic exercise on total and differential leukocyte counts, globulins and albumin/globulin ratio in canine experimental model. We used 12 male, mongrel dogs divided into two groups – animals from experimental group were submitted to exhaustive exercise; animals from control group did no exercise. Total and differential leukocyte counts, globulins and albumin/globulin ratio were measured before exercise (BE), right after exercise (0 h) and on 2<sup>nd</sup> hour, 4<sup>th</sup> hour, 24<sup>th</sup> hour, 48<sup>th</sup> hour and 72<sup>nd</sup> hour and on 7<sup>th</sup> and 14<sup>th</sup> day after exercise. Total leukocyte count increased insignificantly in experimental animals on 2<sup>nd</sup> and 4<sup>th</sup> hour after exhaustive exercise. Neutrophil count increased in a similar pattern. Lymphocyte count in experimental group increased on hour 72 after exercise ( $P < 0.05$ ). Total globulins decreased right after exercise ( $P < 0.05$ ), on 2<sup>nd</sup> hour ( $P < 0.05$ ) and on 4<sup>th</sup> hour ( $P < 0.001$ ) after exercise. A/G ratio increased right after exercise ( $P < 0.01$ ), on 2<sup>nd</sup> hour ( $P < 0.05$ ) and on 4<sup>th</sup> hour ( $P < 0.05$ ) after exercise. In conclusion, exhaustive exercise causes increase in total and differential leukocyte counts, decrease in globulins and increase in A/G ratio.

**Key words:** albumin/globulin ratio, dog, exercise, globulin, leukocyte count

**59. Gundasheva, D., M. Андонова, Dzhelebov P., E. Slavov.** Influence of exhaustive exercise on osmotic resistence of erythrocytes and some clinical parameters in dogs. *Bulgarian Journal of Veterinary Medicine*, 2014, 17, 2, 96-103. (SJR = 0.136).

## Summary

The aim of the experiment was to study the *in vivo* effect of exhaustive aerobic exercise on osmotic resistance of erythrocytes, neutrophil/lymphocyte ratio and some clinical parameters in dogs. We used 12 male, mongrel dogs divided into two groups – animals from experimental group were submitted to exhaustive exercise; animals from control group did no exercise. Minimum osmotic resistance, 5 %

haemolysis, 50 % haemolysis, 90 % haemolysis and maximum osmotic resistance were measured using an osmotic fragility test in the following dynamics: before exercise (BE), right after exercise (0 h), on 2nd hour, 4th hour, 24th hour, 48th hour, 72nd hour and on 7th and 14th day after exercise. Neutrophil to lymphocyte ratio (N/L), body temperature (BT), heart rate (HR) and breathing rate (BR) were measured in the same dynamics. We found a decrease of red blood cell osmotic resistance in experimental dogs (measured by 50 % haemolysis) on 24th hour, 48th hour and 72nd hour and on 7th and 14th day after exercise, as compared to control group ( $P<0.05$ ). Surprisingly in the experimental group maximum osmotic resistance (100 % haemolysis) increased on 24th hour after exercise, compared both to initial level and control group ( $P<0.05$ ). N/L ratio increased significantly in the experimental group on 2nd hour compared to BE level ( $P<0.05$ ). In conclusion, exhaustive exercise acts as a stressor and affects adversely the fragility of red blood cells.

**Key words:** dog, exhaustive exercise, osmotic haemolysis

60. Dzhelebov P., **D. Gundasheva**, M. Андонова, V. Tsoneva, P. Marutsov, E. Slavov. Influence of exhaustive aerobic exercise on some cytokines and serum iron parameters in canine experimental model. *Comparative Exercise Physiology*. 2016, 12, 2, 83-89. (Journal Impact 0.56).

## Abstract

The aim of the experiment was to study the effect of exhaustive exercise on some cytokines and iron status parameters. We used 12 male, mongrel dogs divided into two groups – animals from experimental group were submitted to exercise at moderate intensity with exhaustion as the end-point; animals from control group did no exercise. Serum levels of tumour necrosis factor- $\alpha$  (TNF- $\alpha$ ), interleukin-6 (IL-6), hepcidin prohormone, serum iron (SI), total iron binding capacity (TIBC) and transferrin saturation (TS) were measured before exercise (BE), right after exercise (0 hour) and on 2, 4, 24, 48 and 72 hours after exercise. SI, TIBC and TS were measured also on day 7 and 14 after exercise. Serum levels of TNF- $\alpha$  increased after the exhaustive exercise. Serum levels of IL-6 demonstrated an increase at 0 hour, but increase was not statistically significant compared to BE level. Serum levels of hepcidin prohormone marked a slight increase 48 hours after the exercise, but change was insignificant. Levels of SI decreased on hour 72 ( $P<0.01$ ) and on day 7 ( $P<0.01$ ) and 14 ( $P<0.05$ ) after the exercise, as compared to BE level. Similar were changes in TS. TIBC decreased on 4, 24 and 72 hours ( $P<0.05$ ) after exercise, but only compared to control group. In conclusion, exhaustive exercise causes inflammatory response and a significant decrease in SI levels.

**Keywords:** exhaustive, dog, iron parameters, IL-6, TNF- $\alpha$

61. **Gundasheva D.** Acute-phase proteins in horses – biological functions and diagnostic relevance in inflammation and physical exercise (*представена за публикуване*), 2017. (Импакт фактор 0.381).



## Abstract

Acute phase response is an expression of the early non-specific immune defense of the organism, which is activated in case of compromised homeostasis during a number of pathological processes: inflammation, tumors, infections, immune-mediated inflammatory states, as well as congenital malformations and strenuous physical exercise. This response is mediated by cytokines whose high blood levels exert systemic effects on the central nervous system, the muscles, bone marrow and liver. A drastic change in liver protein synthesis occurs in the direction of synthesizing acute phase proteins. Horses have a specific range of these proteins, whose biological functions and diagnostic value in inflammation have been discussed. The effect of physical exercise on acute phase proteins is also commented.

**Keywords:** acute phase proteins, inflammation, exercise, horses

62. Tsokova L., **D. Goundasheva**. Clinical and experimental studies in spontaneous and experimental alopecia in hens. Study on the acid-base status. *Bulgarian Journal of Veterinary Medicine*, 2004, 7 (2), 107-112.

## Summary

The aim of the study was to follow out the acid-base status in spontaneous and experimental alopecia in hens. For this purpose, 40 Hissex layer hens at the age of 1 year were used. The studies lasted for 2 months after the appearance of clinical signs.

The results showed that the spontaneous alopecia in hens was accompanied by compensated acidosis whereas the experimental alopecia - by decompensated metabolic acidosis with hypercapnia (mixed acidosis).

**Key words:** acid-base status, alopecia, hens

63. Stoev S., **D. Goundasheva**, I. Zarkov, T. Mircheva, D. Zapryanova, S. Denev, Y. Mitev, H. Daskalov, M. Dutton, M. Mwanza, Y. Schneider. Experimental mycotoxic nephropathy in pigs provoked by a mouldy diet containing ochratoxin A and fumonisin B1. *Experimental and Toxicologic Pathology*, 2012, 64 (7-8), 733-741  
(Импакт фактор 2.781).

## Abstract

Mycotoxic nephropathy was induced in eighteen young pigs by mouldy diets containing 0.5 ppm ochratoxin A (OTA) and/or 10 ppm fumonisin B1 (FB1) for three months. While the most obvious damages provoked by OTA were seen in the kidneys as expressed by the strong degenerative changes in proximal tubules and fibrosis in kidneys, FB1 was found to induce an increase in permeability of vessels mainly in lung, brain, cerebellum or kidneys and slight to moderate degenerative changes in kidneys. Pathomorphological damages in pigs exposed to both mycotoxins simultaneously present a combination of the main lesions provoked by each mycotoxin alone being stronger in their expression. Biochemical investigations as expressed by the increase of serum creatinine, urea and enzyme activity

of ASAT/ALAT and by the decrease of serum cholesterol, total protein, albumin and glucose were strongest in pigs exposed to both mycotoxins simultaneously as can be anticipated from the strongest lesions in the kidneys. Both mycotoxins and their combination were found to disturb powerfully humoral immune response in all experimental pigs as expressed by the strong decrease in antibody titer against Morbus Aujeszky at days 21 and 35 after vaccination. Having in mind that the feed levels of the both mycotoxins as well as the exposure time and the pathological findings corresponded to those in some spontaneous cases of porcine nephropathy in Bulgaria and South Africa, it can be concluded that the same mycotoxins are involved in the observed field cases of that nephropathy.

**64. Goundasheva, D.,** H. Hubenov, K. Kostov, T. Karadjov. Changes in levels of some innate immune response parameters, blood vitamins E and A in stallions, following castration. *Trakia Journal of Sciences*, 2005, 3 (5), 1-4.

#### ABSTRACT

We examined in stallions the impact of castration on total differential count of leukocytes and the classical pathway of complement activation (CPCA), blood vitamins A and E levels. The stallions were castrated with an emasculator, while in standing position, using the open technique. The number of leukocytes was counted in the Burkner chamber, and the leukogram on blood smear. The neutrophil/lymphocyte ratio (N/L) was counted; CPCA was shown with Mayer's method adapted for horses. Vitamins E and A concentrations were determined spectrophotometrically. The castration led to an increase in neutrophil bands number 3 hours later and on days 3 and 7; monocytes band number increased also 3 hours post castration. The N/L ratio increased on the 24th hour. The CPCA was reduced on the 0 hour, and the amount of vitamin E - on the 24th hour. The applied castration caused temporary and quantitative changes in the examined parameters of innate defence by suppressing its humoral component – complement (0 hour) and caused an increase of the cell elements – neutrophils band and monocytes and the N/L ratio. It led to E hypovitaminosis.

**Key words:** castration, innate immunity, vitamin A, vitamin E, stallions

**65. Prelesov P., N. Grozeva, D. Goundasheva.** Pathomorphological changes in the tissues of chickens, experimentally infected with biting lice (Phthiraptera-Insecta). *Veterinarski arhiv*, 2006, 76 (3), 207-215 (**SJR = 0.138**).

#### ABSTRACT

A study into the death rate and pathomorphological changes in the tissues of chickens experimentally infected with biting lice from the species *Eomenacanthus stramineus* Nitzsch (1818), *Menacanthus cornutus* Schömmmer (1913), *Menopon gallinae* L. (1758) and *Goniocotes gallinae* DeGeer (1778) is presented. Five of 20 infected birds died (25% death rate). Following necropsy of dead birds and after histological investigation of skin, muscle, spleen, liver, lungs and kidney specimens, multiple wounds and haemorrhages were macroscopically observed on skin surface, while histologically in all cutaneous layers, as well as in the other studies, tissue hyperaemia, haemorrhages, haemosiderosis, pseudoeosinophilic and hystiocytic infiltration were present. Inflammation of the small intestines was also noticed. The evidenced changes were of both local and systemic character.



Local lesions were due to the direct aggression of *Mallophaga*. The systemic changes were manifestations of the sensitization and intoxication that occurred in the avian organism following the biting lice infestation.

**Key words:** *Phthiraptera*, *Mallophaga*, chickens, pathomorphology, hyperaemia, haemosiderosis

66. Prelesov P, **D. Goundasheva**, N. Grozeva. Haematological changes in chickens, experimentally infected with biting lice (Phthiraptera-Insecta). *Bulgarian Journal of Veterinary Medicine*, 2002, 5 (1), 29-38.

#### Summary

The aim of the study was to determine the haematological changes in chickens, experimentally infected with biting lice from the following species: *Eomenacanthus stramineus* Nitzsch (1818), *Menacanthus cornutus* Schömmmer (1913), *Menopon gallinae* L. (1758) and *Goniocotes gallinae* DeGeer (1778). The experiments were performed on 30 (20 experimental and 10 control) 2-month-old chickens (*Gallus gallus domesticus*).

The infection with biting lice resulted in reduction in red blood cell (RBC) counts and haemoglobin content, increase in the mean corpuscular haemoglobin (MCH), the mean corpuscular haemoglobin concentration (MCHC), the mean corpuscular volume (MCV) and the haemoglobin index (HbI), indicating the development of a hyperchromic anaemia. The white blood cell (WBC) counts were elevated as well as the percentages of eosinophils and monocytes following activation of the innate defense mechanisms. Lymphocyte percentages were lower. Both qualitative and quantitative haematological changes observed in chickens, infected with biting lice, were the highest during the period of most intensive invasion (September).

**Key words:** anaemia, biting lice, chickens, *Mallophaga*, *Phthiraptera*

67. Kirkova Z., P. Petkov, **D. Goundasheva**. Clinical and hematological studies in dogs, experimentally infected with trichuris vulpis. *Bulgarian Journal of Veterinary Medicine*, 2005, 8 (2), 141-148.

#### Summary

The experiment was performed on 9 mixed-breed dogs (6 infected and 3 non-infected controls). The experimental infection was provoked with *Trichuris vulpis* (10000 eggs/kg). The clinical signs and the following haematological parameters were monitored: haemoglobin, packed cell volume, red blood cell counts and morphology, mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC), mean corpuscular volume (MCV), haemoglobin index (HbI), erythrocyte sedimentation rate (ESR), total and differential white blood cell counts.

A typical clinical signs of the disease was the diarrhoea that resulted in full exhaustion and cachexia. In infected dogs, elevated haemoglobin and MCH values were observed between post infection days 60 and 207, decreased MCV by day 15 and 35 and no changes in PCV, HbI values and red blood cell morphology. Also, a leukocytosis with eosinophilia, neutrophilia (on the account of segmented neutrophils' elevation), lymphocytopenia and enhanced ESR were found out.

**Key words:** dogs, *Trichuris vulpis*, trichurosis

68. Николов Н., Д. Гундашева, М. Андонова. Тромбоксан B<sub>2</sub> при пилета с експериментална борелиоза. *Ветеринарна медицина*, 2005, 9 (3-4), 43-47.

### Резюме

Проуванията са осъществени върху 120 едномесечни пилета бройлери. Те са разделени в четири групи: заразени нетретиран; нетретиран и третиран с по 30 mg/kg osarsol; заразени и третиран с по 10 mg/kg dehydrocortison; заразени и третиран с по 12,5 mg/kg  $\alpha$ -tocopherol. Към всяка от четирите групи имаше група от незаразени контролни пилета. Пилетата са заразявани с по 7 млн. Борелии от вида *Borrelia anserina* – серотип Памукчий. Определянето на TXB<sub>2</sub> в кръвните проби беше осъществено с Thromboxane B<sub>2</sub> (125-I) Radioimmunoassay kit with BioRad – Magnetic Separation на фирма DRG Instruments, Germany, в границите от 4,1 pg/0,1 до 1000 pg/0,1 ml. Резултатите са представени в две таблици и една фигура. Значими са резултатите на 24-тия, 72-рия и 96-ия h. Най-голям растеж на стойностите на тромбоксана на 24-тия h са установени при третираните с dehydrocortison ( $p=0,004$ ). Спрямо групата на нетретираните заразени статистическата достоверност ( $p=0,002$ ;  $r=0,878$ ) е най-внушителната за този период от развитието на болестта. Демонстративно ниски бяха стойностите и различията между групата на нетретираните заразени и тези, заразени и третиран с  $\alpha$ -tocopherol на 72-рия, 96-ия и 120-ия h.

**Ключови думи:** Thromboxane B<sub>2</sub> (TXB<sub>2</sub>) - thromboxane A<sub>2</sub> (TXA<sub>2</sub>) – phospholipase A<sub>2</sub> – phospholipase C – osarsol – dehydrocortison -  $\alpha$ -tocopherol – *B. anserina* – borreliosis

69. Sotirov L., D. Goundasheva, M. Andonova, S. Denev, M. Dimitrov, N. Vassilev. Sel-plex and sodium selenite dietary supplements with resulting serum lysozyme and complement activities in sows and progeny during post partum periods. *Trakia Journal of Sciences*, 2007, 5 (1), 20-27.

### ABSTRACT

The aim of this study was to investigate the potential immunomodulating effects of selenium added to diets in an organic (Sel-plex®) or a mineral form (Na selenite) in sows and in their progenies. For that, concentrations of these substances were studied in blood samples from 14 sow dams before and after parturition. The same procedure was done in the progenies, 20-35 days, post-partum. In spite of the large dispersion of lysozyme concentrations, this parameter was markedly depressed at parturition only in untreated sows, whereas in supplemented females, lysozyme concentrations remained close to basal values. By contrast, the alternative pathway of complement activation (APCA) values increased at parturition and immediately after, then slowly decreased in the 3 groups, but in the Sel-plex® group, these variations were lower than in the 2 other groups. Variations of the classical pathway of complement activation (CPCA) were characterised by gradual decreases and then recovery in all the groups, the lowest decreases being in the Na selenite group. Furthermore, treatment of sow dams by Sel-plex® promoted increases of lysozyme concentrations and complement activities in piglets. In essence, organic selenium supplementation in sows during pregnancy and post-partum stimulates innate immune responses.

**Key words:** sows, piglet, Sel-plex®, Sodium selenite, complement, lysozyme



70. Цачев И., Д. Гундашева. Моноцитарный эрлихиоз у собак: Биохимические исследования. *Сборник доклады. Материалы международной научной конференции по патофизиологии животных. Санкт Петербург, 25-26 мая, 2011,* 123-124.

Моноцитарный эрлихиоз (МЭ) у собак заболевание, переносчиком которого являются клещи. В Болгарии обнаружено недавно. Это заболевание изучено комплексно и биохимические изменения, представленные в данном сообщении, являются частью исследовательской работы нашей группы.

Исследовано 12 собак заболевших МЭ. Собаки были пациентами частных ветеринарных кабинетов и показали следующие клинические признаки: депрессия, апатия и анорексия, в отдельных случаях – петехии и экхимозы на коже и слизистой оболочке, лимфаденопатия и увеит. Диагноз МЭ поставлен на основании клинических и лабораторных результатов (IFA). До начала исследования животные не проходили курс лечения.

Биохимические исследования проводились с тестами Roche Diagnostic GmbH, Germany, на биохимическом анализаторе (BA – 88, Mindrey, Korea) и включали в себя 9 показателей: общий белок (g/l), альбумин (g/l), глобулины (g/l), альбумин- глобулиновый индекс (А/Г), мочевины (mmol/l), креатинин (mmol/l), щелочная фосфатаза (AP / U/l), аланинаминотрансфераза (ALAT/ U/l), аспартатаминотрансфераза (ASAT/ U/l).

Количество общего белка у 58.33% собак и количество глобулинов у 66.67% собак было повышено, в то время как уровень альбумина у 41.67% и соотношение альбумин/глобулин у 83.33% понижается. Эти показатели у остального процента собак находились в референтном диапазоне (54-75 g/l). Небольшие изменения обнаружены в исследованных ферментах. 16.66% собак показали увеличение активности ALAT (свыше 55 U/l) и AP (свыше 108 U/l). Только у 8.33% собак увеличился уровень сывороточного фермента ASAT, в то время как у 91.67% поддерживался в референтном диапазоне (5-55 U/l). Уровень мочевины у 33.33% собак увеличенный, а у 66.67% поддерживался в референтном диапазоне (6.8- 18.9 mmol/l). Измененный уровня сывороточного креатинина (в номе 35-106 mmol/l) у исследованный собак не установлено.

71. Tsachev I., D. Goundasheva, V. Kontos, Papadogiannakis, S. Denev. Haematological profiles in canine monocytic ehrlichiosis: a retrospective study of 31 spontaneous cases in Greece. *Revue de Medicine Veterinaire*. 2013, 164 (6), 327-330.

(Импакт фактор 0.251; SJR 0.209)

## SUMMARY

This study investigated the haematological parameters in 31 dogs naturally infected with *Ehrlichia canis* according to clinical signs and serological analyses. Whereas the platelet numeration was depressed in 35.48% dogs, anomalies in erythrocyte numeration and morphology were frequently observed: haemoglobin concentration, haematocrite and erythrocyte numeration were decreased in 25.80%, 19.35% and 19.35% infected animals, respectively, red cell distribution width was enlarged in 80.64% of cases and macrocytosis evidenced by high mean corpuscular volume and confirmed by microscopic examination of blood smear was observed in 90.32% of dogs. In addition, 83.67% of dogs exhibited anisocytosis. A depressed mean corpuscular haemoglobin concentration was obtained

in all samples and hypochromia was microscopically confirmed in 93.54% of cases. Monocytopenia and eosinopenia were frequently observed and were eventually coupled to leukopenia (35.48%) and/or neutropenia (25.80%). Variations in haematological profiles may be due to differences in strain virulence and antigenicity, clinical forms of the disease and the eventual occurrence of concomitant infections.

**Keywords:** canine ehrlichiosis, retrospective study, haematology, anaemia, hypochromia, macrocytosis, monocytopenia, eosinopenia.

72. Bozakova N., L. Sotirov, T. Koynarski, **D. Goundasheva**. Effect of immunomodulator “Immunobeta” on humoral immunity in layer hens. Pakistan Veterinary Journal. 2017, (представена за печат). (Импакт фактор 0.822 за 2017).

#### ABSTRACT

The effect of immunomodulator “Immunobeta” was investigated on 6750 layers hybrid Loman Brown divided in two equal groups (n=3375) – one control and one experimental. The layers were housed in enriched cages constructed in large battery for 3375 hens – one per each group. The experiment started when hens were at 18 weeks of age. The control hens received the usual diet for their age, whereas the experimental birds received a diet supplemented with “Immunobeta” at a dosage 4 kg/tonne in continuation of 2 months. The first analysis were conducted prior treatment (test I), while the second study was done at the end of treatment, i.e. 2 months later (test II). The evaluation of residual effect of the immunomodulatory was checked one month after the end of treatment (test III). Twelve hens from each group were analysed in each test. The results indicate that “Immunobeta” increases lysozyme concentration in blood sera and hens’ egg white. The tested immunomodulatory was found to elevate the activity of alternative pathway of complement activation and increase the concentration of IgM as well.

**Key words:** hens, Immunobeta, lysozyme, complement, IgG, IgM.

73. Гундашева Д., И. Бръчкова. Контрол върху качеството на експериментите с животни. *Ветеринарна медицина*, 2006, 10 (1-2), 63-66.

#### Резюме

При проучването на важни проблеми, свързани с биологията и патологията на животните и човека се прибягва до експерименти с животни. Качеството на резултатите от тези експерименти зависи от контролирането на генетичната чистота на



използваните животни, на микробиологичния им статус, хигиената на хранене, както и спазването на стандартни оперативни процедури, включващи факторите на жизнената среда, при които те са поставени.

**74. Гундашева Д., Н. Бозакова, П. Джелебов.** Методология за защита и хуманно отношение към домашните любимци (**монография**). Изд. “Кота”, Стара Загора, 2010. ISBN : 978-954-305-284-4

Целта на предлаганото издание е да даде основни и специализирани знания за различни видове домашни любимци на съвременно ниво относно практическите аспекти на тяхното отглеждане, грижи, хранене, поене, репродукция и превенция от болести, към които те са податливи. Тези знания за домашните любимци са изцяло в съответствие с действащите понастоящем нормативни изисквания за защита и хуманно отношение към животните (Закон за ветеринарномедицинската дейност, Закон за защита на животните, Наредба № 41 за изискванията към обекти, в които се отглеждат, развъждат и/или предлагат домашни любимци с цел търговия, към пансиони и приюти и Наредба № 39 за условията на отглеждане на животните компаньони, съобразени с техните физиологични и поведенчески особености).

Включеният в книгата материал ще обогати професионалната компетентност на лицата, които търгуват и обслужват домашните любимци в зоомагазините и развъдниците. Тя е ценен информационен източник за студенти по ветеринарна медицина, биология и животновъдство и за всички любители на гризачи, зайци, кафезни птици и декоративни риби.

**75. М. Андонова, Гундашева Д.** Имунология (**учебник**). Изд. “Кота”, Стара Загора, 2007. ISBN : 978-954-305-198-4

Учебникът по имунология е написан в съответствие с учебната програма по тази дисциплина, включена в новия учебен план на Ветеринарномедицинския факултет при Тракийски университет – Стара Загора, утвърден от Академичен съвет с Протокол № 6 от 12 май 2004 г. Той е с подчертана насоченост към характеризиране на основните имунологични понятия. Учебникът дава разбиране за най-важните принципи, по които функционира имунната система – изяснява аспектите на структурната ѝ организация, сложните взаимоотношения между нейните компоненти и прецизните механизми за регулирането ѝ, предопределящи способността ѝ да протектира организма от болести с инфекциозен и неинфекциозен генезис.

Този учебник разкрива възможност принципите на базисната имунология да бъдат използвани при изясняване на редица клинично важни състояния, свързани с увреждане на имунната система и последствията от това – свръхреактивност или дефицитни болести, водещи до тежки нарушения за организма. Предоставени са най-нови данни относно специфичните особености при нормалното и в състояние на патология функциониране на имунната система при различни видове животни.

Включеният материал ще даде фундаментални знания на студентите по ветеринарна медицина, които по-късно в учебния процес те ще задълбочат по отношение на различните аспекти на

науката имунология. Тя ще помогне и на практикуващи ветеринарни лекари, които имат нужда от осъвременяване на знанията си за фундаменталните принципи на имунологията с оглед контролиране имунния статус на болни животни и коригиране влиянието на различни патогенни, лекарствени, технологични и др. фактори върху него.

**76. Гундашева Д.** Биометодология за хуманното използване на лабораторни животни в медикобиологични и научни изследвания. Ръководство по Организация на експеримента. Изд. "Кота", Стара Загора, 2008. ISBN: 978-954-305-234-9

Ръководството за практически упражнения по Организация на експеримента е написано в съответствие с учебната програма по тази дисциплина, включена в новия учебен план на Ветеринарномедицински факултет при Тракийски университет – Ст. Загора, утвърден от Академичния съвет с Протокол № 6 от 12 май 2004 год.

Ръководството за практически упражнения по Организация на експеримента е съобразено с най-новите изисквания по отношение защитата и хуманното отношение при използване на животни в експерименти за образователни и научни цели. Според приложената биометодология при различни видове животни, подбрани като модели за експериментиране (мишки, плъхове, хамстери, морски свинчета, зайци, кучета, птици и жаби), са показани оптимизирани техники за фиксиране и обездвижване, както и прилагане на най-подходящите наркотични вещества за анестезия, аналгезия и евтаназия при хирургически интервенции, с оглед избягване на болка, дистрес и страдание. Разгледани са също и допустимите методи за получаване на биологични течности и стандартните процедури при въвеждане на лекарства и разтвори (начини на прилагане, препоръчания максимален обем, размер на иглите и място на прилагане). Направена е кратка характеристика на дадения вид животни, включваща описание на техния произход, биологични особености и специфичното им приложение като обект за експерименти в съответните области на научното познание. Биометодологията на всеки от разглежданите видове животни е онагледена с богат снимков материал. Разгледана е и новата концепция за използването на алтернативни методи, заместващи експериментите с животни. Настоящото ръководство ще помогне за осъществяване в науката на качествено експериментиране с животни и за формирането на етични принципи у студентите и изследователите при опити с тях.

**77. М. Андонова, Гундашева Д., Е. Славов, П. Джелебов.** Ръководство за упражнения по имунология. Изд. "Кота", Стара Загора, 2010. ISBN: 978-954-305-283-7

Ръководството за практически упражнения по имунология е написано в съответствие с учебната програма по тази дисциплина, включена в учебния план на Ветеринарномедицинския факултет при Тракийски университет – Стара Загора, утвърден от Академичен съвет с протокол №6/12 май 2004 г.

В ръководството е представен широк спектър от имунологични методи за изследване елементите на естествения и на адаптивния имунитет. Тяхната висока информативност, описанието на необходимите материали за осъществяването им и на техниката на изпълнението им позволява лесното им внедряване във ветеринарномедицинската практика с цел ефективен контрол при протичането на много заболявания с имунологична патогенеза.

Авторите са се постарали да представят различни методи за оценяване на даден имунологичен показател. Това позволява на съответния специалист в зависимост от необходимостта,



оборудването с което разполага и компетентността си да избере най-подходящата за конкретния случай техника. Коментирани са предимствата и недостатъците на методите, както и факторите, влияещи върху получените резултати – условията на вземане и съхранение на биологичния материал, използването на антикоагуланти и консерванти. Отчетена е ролята на биологичния вид, представени са експериментални модели, върху които е проследено влиянието на различни екзогенни химични и биологични агенти, като е посочен изборът на най-подходящата техника.

Материалът е представен в пет раздела. В първите два раздела са разгледани клетъчните и хуморални елементи на естествения и на адаптивния имунитет, като са описани методите за оценяването им. Показано е многообразие от техники за изолиране, пречистване, идентифициране, количествено определяне на Т- и В-лимфоцити и проучване на тяхната функционална активност. Трети и четвърти раздел са посветени на хуморалните елементи на адаптивния имунитет – антителата, на проявите на реакцията антиген – антитяло, както и на електрофоретичните и имунодифузионни методи за доказването ѝ. В петия раздел са моделирани реакции на свръхчувствителност от бърз и забавен тип, като са изяснени методите за оценяването им.

**78. Гундашева Д., М. Андонова, Е. Славов, П. Джелебов. Ръководство по функционална патология. Изд. "Тракийски университет", Стара Загора, 2013.**  
ISBN: 978-954-338-068-8

Ръководството за практически упражнения по функционална патология е написано в съответствие с учебната програма по тази дисциплина, включена в учебния план на Ветеринарномедицински факултет при Тракийски университет – Стара Загора, утвърден от Академичния съвет с протокол №6/12 май 2004 год.

Много от знанията в областта на науката Функционална патология са придобити от изследвания, направени върху опитни животни. Моделирането на патологични състояния върху опитните животни е много важен и съществен елемент от обучението на студентите по ветеринарна медицина. Използването на лабораторни животни за такава образователна цел, изцяло е съобразено със законодателните изисквания за защитата и хуманно отношение към тях. Затова са включени малък брой животни и то видове, с ниска степен на неврофизиологична чувствителност. Предпочетени са опити, които не водят или предизвикват в по-слаба степен болеви усещания. За тяхното елиминиране, за намаляване стреса и страданието на опитните животни са прилагани подходящи техники на фиксиране и манипулации, както и местна и обща анестезия.

В ръководството по Функционална патология са описани експерименти, даващи възможност за изучаване на патогенетичните механизми на възникване на болестите. Включени са модели на типови патологични процеси като треска, хипоксия, нарушения в обмяната на веществата, електролитите и водата. Моделирани са също често срещани в клиничната практика нарушения в киселинно-алкалното равновесие и в различни органи и системи на организма – кръв, сърдечно-съдова, дихателна, храносмилателна и нервна. Проследяването на тези нарушения по време на практически занятия и интерпретирането на получените от тях резултати, дава възможност на студентите да се запознаят с причините и условията за възникването на патологичните процеси, да се ориентират в основните звена на механизмите и характерните особености на развитие на тези процеси, да могат да характеризират патогенните и адаптивните процеси, да им се покажат принципите на терапевтична намеса, на базата на нарушените патогенетични механизми. Такъв подход има за цел да създаде основа за разбиране на теоритичните знания по редица важни въпроси на функционалната патология, да формира логическо медицинско

мислене и способност за анализиране на наблюдаваните нарушения във функциите на организма, да изгради вещина за трансформиране на фактологическата форма на знания в професионалната дейност. Важен момент е и придобиването на практически умения за работа с животни, които са съществен аспект от практиката на ветеринарния специалист.

**79. Гундашева Д.** Организация на експеримента. (учебник). Изд. "Кота", Стара Загора, 2013. ISBN: 978-954-305-349-0

Учебникът „Организация на експериментите с животни” е написан в съответствие с учебната програма по дисциплина "Организация на експеримента, включена в учебния план на Ветеринарномедицинския факултет при Тракийски университет – Стара Загора, утвърден с Протокол № 6 от 12 май 2004 год.

В него са разгледани най-новите законодателни изисквания за защитата и хуманното отношение към опитните животни, организацията и управлението на експериментите с животни, както и важни аспекти, свързани с благосъстоянието на опитните животни и етичното отношение към тях.

Този учебник е предназначен за студенти по ветеринарна медицина, но може да се използва и от студенти и научни работници от други специалности като медицина, биология, животновъдство и др., използващи животни в медико-биологични и научни изследвания.

**80. Гундашева Д., П. Джелебов.** Биометодология за хуманното използване на лабораторни животни в медикобиологични и научни изследвания. Ръководство по Организация на експеримента. Второ преработено издание. Изд. "Кота", Стара Загора, 2017. ISBN: 978-954-305-447-3

Ръководството за практически упражнения по Организация на експеримента е написано в съответствие с учебната програма по тази дисциплина, включена в новия учебен план на Ветеринарномедицински факултет при Тракийски университет – Ст. Загора, утвърден от Академичния съвет с Протокол № 10 от 21 януари 2017 год.

Въз основа на литературни данни и многогодишния опит на авторите, в него са включени нови знания при организирането и използването на животни в експерименти. Ръководството ще помогне в обучението на студентите по ветеринарна медицина и ще обогати с информация научни работници, практикуващи ветеринарни лекари, специалисти по медицина, биология, микробиология и животновъдство при работата им с лабораторните животни.

18.07.2017 год.

Подпис:.....  
(доц. д-р Димитрина Гундашева, дн)