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THE GENERAL MORPHO-FUNCTIONAL STATE OF THE STUDIED ORGANS WITH THE USE OF DRUGS WITH IMMUNO-CORRECTIVE AND BIOCIDAL EFFECTS DURING THE CULTIVATION OF BROILER CHICKENS

ЗАГАЛЬНИЙ МОРФОФУНКЦІОНАЛЬНИЙ СТАН ДОСЛІДЖУВАНИХ ОРГАНІВ ЗА ВИКОРИСТАННЯ ПРЕПАРАТІВ ІМУНО-КОРИГУВАЛЬНИХ ТА БІОЦИДНОЇ ДІЙ ПРИ ВИРОЩУВАННІ КУРЧАТ-БРОЙЛЕРІВ

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Abstract. *The results of the study of drugs with immuno-corrective and biocidal effects, which can be effectively used in the conditions of poultry farming to optimize immune processes, strengthen natural resistance and immunological reactivity in order to increase the productivity and resistance of poultry to diseases, are presented. It was established that during the histological examination of the liver of the first experimental group of 40 day-old broiler chickens, minor areas of perivascular lymphoid infiltration were revealed as a result of the hepatoprotective effect. The presence of light granularity of the cytoplasm of hepatocytes may be associated with the activation of protein metabolism in the body. Complex activation of individual groups of hepatocytes, focal*

perivascular lymphoid infiltration, hyperplasia of the epithelium of the bile ducts characterizes a pronounced cholinergic and choleretic effect (reaction). Histological examination of the liver of the second research group of 40 day-old broiler chickens revealed activation of extramedullary hematopoiesis, which may indicate stimulation of erythropoiesis and hemoglobin formation in the bird's body. Histological examination of the liver of a control group of 40 day-old broiler chickens revealed the development of distinct microscopic changes that may be a sign of bacterial liver damage against the background of the development of secondary bacterial infection, as well as the development of cholangitis and hepatitis. Histological examination of the heart of a control group of 40 day-old broiler chickens revealed the presence of changes indicating the development of myocardial dystrophy.Histological examination of the spleen of the first research group of 40 day-old broiler chickens revealed hyperplasia of lymphoid follicles, which is a sign of the body's immunological reactivity. Histological examination of the spleens of the control group of 40 day-old broiler chickens revealed changes that may indicate a weakening of the immune system, which was preceded by an active immune response. Usually, the detected changes are accompanied by a slow course of systemic bacterial infection of the body, which leads to a significant weakening of immunocompetent organs. The histological examination of the glandular stomach of the first research group of 40 day-old broiler chickens revealed the activation of the secretory function of the glandular apparatus, which can be characterized as a positive effect on the digestion process, because intensive primary enzymatic processing of feed contributes to the improvement of nutrient absorption processes in the intestines. The process of digestion and fermentation in the gastrointestinal tract is activated. Changes were found in the control group, which may indicate the development of proventriculitis. The detected changes may indicate the development of inflammatory processes that may occur as a result of the development of a systemic bacterial infection. Histological examination of the bursa of Fabricius of a control group of 40 day-old broiler chickens established an immunosuppressive state as a result of early exhaustion of the lymphoid organ as a result of the development of a systemic bacterial infection.Histological examination of the intestine of the first experimental group of 40 day-old broiler chickens showed hyperplasia of local lymphoid formations, which indicates immunoreactivity. A histological examination of the intestine of a control group of 40 day-old broiler chickens revealed the presence of changes that indicate the development of a sluggish course of bacterial enterocolitis accompanied by digestive dysfunction.

Key words: *lymphoid follicle, broiler chickens, hyperplasia, immunoreactivity, fermentation*

Introduction.

The effectiveness of any medical and preventive measures depends on the complex use of disinfectants to break the epizootic chain. To solve this problem, biocidal products are used, designed to destroy, neutralize or suppress bacteria, viruses and fungi by chemical or biological means. The main factors affecting the effectiveness of such agents are the spectrum of antimicrobial action (effectiveness against viruses, bacteria, spores under different environmental temperature and pH changes, absence of mutagenic effect on microorganisms), safety of the disinfectant (absence of embryotoxic, teratogenic, carcinogenic, allergenic and cumulative properties), corrosive activity, high permeability, environmental safety. The researchers established that the annual need for biocides for the domestic industry exceeds 3 thousand tons [1-3].

Analysis of the official market of veterinary disinfectants based on registration materials for veterinary medicine [5, 7]. In Ukraine, 161 disinfectants are offered for the poultry industry (94% of the registered number). Among them, 58.1% are products presented by foreign manufacturers, however, a fairly wide range of products of the domestic pharmaceutical industry indicates the high potential of

Ukrainian manufacturers of animal protection products. Among them, the largest percentage is the group of alkaline agents (67.9%), biocides based on aldehydes (mainly glutaraldehyde). The second largest group (12.4%) is formed by disinfectants based on quaternary ammonium compounds (CA). The third group (11.1%) consists of acid-containing disinfectants. The rest (8.6%) are biocides based on chlorine and agents based on only CHAS without aldehydes, as well as oxygen-, chlorine-, iodine- and silver-containing compounds. At the same time, due to the increasing introduction of disinfectants into practice, the problem of the possible formation of resistance to them in bacteria arises. It is known that the basis of the resistance of microorganisms to disinfectants lies in the genotypic mechanism, which has not yet been sufficiently studied. It was established that the nature of the formation of resistance of microorganisms to biocides and antibiotics is different: in the first case - chromosomal, in the second - plasmid, which generally complicates the selection of disinfectants. Taking into account the fact that the growth of resistance to some groups of disinfectants can become latent, disinfectants should be periodically rotated [2, 4, 6, 8]. The strategy of prevention of infections in industrial poultry farming is based on a set of measures aimed at effective neutralization of pathogens at any stage of their development.

Recently, probiotic preparations have been used as feed additives in poultry farming, which makes it possible to replace antibiotics and other chemical agents [9, 10]. In combination with biocidal preparations, probiotics strengthen the body's functions by regulating redox processes, and also correct carbohydrate, protein and fat metabolism, maintain chemical balance, and act as powerful natural antioxidants. Along with this, probiotics have anti-toxic, hepatoprotective, anti-stress, adaptogenic, anti-allergic, tonic, immunomodulating, interferonogenic, anti-inflammatory, reparative, antibacterial and antiviral effects. Thus, the complex use of probiotic and biocidal drugs is a prospect for obtaining an increase in quality products in poultry farming [11, 12].

The purpose and tasks of the research.

The goal is to experimentally substantiate the development and research of the immuno-corrective probiotic preparations "Biomagn" and "Biozapin" and the biocidal action of "Biolaid" and "Diolaid", which can be effectively and comprehensively used in the conditions of poultry farming to optimize immune processes, strengthen natural resistance and immunological reactivity in order to increase the productivity and resistance of poultry to diseases.

Research materials and methods.

The experiment was conducted in the conditions of the vivarium of the State Research Institute of Laboratory Diagnostics and Veterinary-Sanitary Examination. Groups of broiler chickens were formed by the method of groups of analogues. 2 experimental and 1 control group of COBB-500 cross broilers were formed in the amount of 50 heads, aged 5 days. The bird was fed complete ration compound feed "Starter" (first 14 days) and "Grover" until the end of the experiment. Experimental groups I and II were fed compound feed with the addition of the symbiotic drug "Biomagn" from the first to the seventh and from the 22nd to the 27th day of cultivation at the rate of 0.5 mg per kilogram of compound feed. At the same time,

the broilers of the research group were given a solution of the drug "Diolaid" (based on chlorine dioxide) with water, 1.0 mg/l per chlorine dioxide, which corresponds to a concentration of 0.0004%, throughout the experiment.

"Biozapin" was also included in the scheme of technological cultivation, which was used once every 2 weeks, evenly spraying in the room for keeping poultry at the rate of 10–30 g/m2. Disinfection in the premises for keeping poultry was carried out with the biocidal preparation "Biolaid" 0.2% (based on hydrogen peroxide, perlactic acid, lactic acid) with an exposure of 60 minutes. The control group received a standard cultivation scheme.

All stages of research were carried out in accordance with the "European Convention for the Protection of Vertebrate Animals Used for Research and Other Scientific Purposes" (Strasbourg, 1986) and approved by the Bioethics Commission (Protocol No. 10 of January 28, 2021).

To determine the morphofunctional state of the studied organs of broiler chickens, the histological method was used. After the bird was slaughtered, fragments of the liver, heart, spleen, glandular stomach, cloacal bursa, and intestine were selected. Pieces 0.3-0.5 cm thick were cut through the entire thickness of the organ (tissue) and placed in disposable plastic cassettes. The latter were labeled, indicating the date, working number and name of the organ, and placed in a fixing liquid to preserve the tissue and cellular structure of the organ. For this, a 10% aqueous solution of neutral formalin was used, the volume of which was 20-40 times greater than the volume of the sampled material. The dishes were tightly closed and left in a fume cupboard at room temperature for one day (24 hours).

A day later, tissue histological processing was carried out in an STP-120 carousel machine, where the material was fixed, washed, dehydrated and sealed. Dehydration of tissues was carried out by sequentially passing the samples three times through isopropanol (exposure 90 min, t 22±2 ºC) and three times through isopropanol (exposure 60 min, t 22±2 ºC). The sample was compacted sequentially, keeping it in an intermediate solvent - xylene: isopropanol 3/1 (exposure 90 min, t 22±2 ºC), xylene (exposure 90 min, t 22±2 ºC) and two portions of histological paraplast - Richard-allan type 6 (for infiltration and filling, Microm, Germany) (exposure 120 min, t 62 ºC).

The formation of paraffin blocks was carried out using the AR-280 paraffin pouring station (heating, dosing, cooling console). Cassettes with samples were transferred to the heating unit of the station. Using tweezers, the samples were placed in metal molds, oriented in the desired direction, transferred to the heating surface of the dosing unit, covered with an identified plastic cassette and poured with melted paraffin (t 60±2 ºC). The form was transferred to the cooling surface of the cooling unit and left until the paraffin solidifies completely. The formed paraffin block was removed from the metal mold for the production of tissue sections.

Sections were made using a rotary microtome HMS 340E with an STS - section transfer system. The thickness of the sections was 5 μm. The obtained sections were spread on the surface of STS water (t 42±2 ºC) and the sections were transferred to a prepared glass slide and left to dry at room temperature for 12–24 hours. Sections were deparaffinized according to the following scheme: xylene I – 5 min; xylene II –

5 min; alcohol 96% I – 5 min; alcohol 96% II - 5 min; running water - 5 min. After deparaffinization, the sections were stained. Histosections were dyed using an HMS-70 linear tissue dyeing machine. Staining with hematoxylin and eosin was carried out to identify the main structural elements of tissues according to the following scheme: hematoxylin - 3 min; running water - 5 minutes; alcohol eosin 1% - 2 min; running water - 1 min; alcohol 70% - 1 minute; alcohol 96% I - 1 min; alcohol 96% II - 1 min; carbol-xylene (3:1) – 5 min; xylene - 5 min. Histosections were sealed in CytosealTM 60 sealing medium and covered with a cover glass.

Microscopy of the prepared histopreparations was carried out using an Axioskop 40 laboratory microscope on "bright field" contrast with 4x, 10x, 20x, 40x lenses and a color digital camera Industrial Digital Camera 8.OMP 1/2.5 Color USB 2.0 with a resolution of 8.0 MP. which reflected the actual increase of objects in the field of view. ToupView software was used for image analysis.

Research results.

When conducting a post-mortem examination of broiler chickens, attention was paid to the pathological characteristics of the following organs:

Condition of subcutaneous tissue - location and amount of fat, color, consistency, condition of blood vessels.

Skeletal muscles - structural volume, color, consistency, homogeneity of color, cross-sectional pattern, state of blood vessels.

Thymus gland - structural volume, preservation of shape, consistency, color, cross-section pattern.

Hearts – shape, condition of subepicardial fat, homogeneity of color, consistency, condition of blood vessels.

Lungs – structural volume, consistency, color, blood volume.

Spleens – structural volume, consistency, state of the capsule, cut surface pattern, pulp scraping, blood volume.

Liver - structural volume, consistency, state of the capsule, cut surface pattern, pulp scraping, blood volume, gallbladder-fullness, consistency, color of bile.

Glandular and muscular stomachs - shape, size, degree of filling with fodder masses, condition of the wall and its membranes, condition of the mucous membrane, condition around gastric fat.

Description of the nature of morphological changes

the first research group	
Name of the body	*Cobb 500 cross broiler chickens, 42 days old*
Liver	The architecture of the liver is preserved. The liver capsule is represented by a thin layer of mesothelial cells, the structure is preserved. A typical structure is visualized, the lumens of the sinusoids are uniformly expanded. Hepatocytes have a typical polygonal shape, forming a slightly noticeable sinusoidal line around the hepatic triad of the bile duct, hepatic artery and vein. The nuclei of hepatocytes are of a typical rounded shape, located centrally, the nucleolus is visualized, the

	chromatin is clear, intensely colored. Cytoplasm is somewhat granular, light granularity is noticeable, in some areas the borders of the cells merge. Kupffer cells are clearly visualized, their slight proliferation is observed in certain areas, which may be a sign of a non-specific local immune response. In the areas of individual triads, diffuse activation of individual groups of hepatocytes (cytoplasm of such cells is heterogeneous, more intensively stained in pink color, nuclei. Rounded lymphoid formations are revealed, which is a characteristic structure of normal liver histology and minor areas of perivascular lymphoid infiltration, as a result of hepatoprotective action. Epithelium of bile ducts hyperplastic in places, clear. Parenchyma in the form of thin layers of connective tissue. Blood saturation of the organ is good.
Heart	During the examination of the heart muscle, a typical structure was revealed, the myocardium is represented by bundles of muscle fibers, which are connected to each other by a small amount of connective tissue. Cardiac fibers are long, cylindrical, branched, have one oval, centrally located nucleus. Well-formed cardiomyocytes with well-defined transverse striations. In the sarcolemma, a characteristic striation is clearly visible. The structure of the vessels was not changed, a well-developed vessel wall was revealed, which had a typical structure. The vessel wall is preserved, intact.
Spleen	Examination of the spleen revealed a dense and intact connective tissue capsule of the organ with layers of smooth myocytes. Typical mantle and marginal zones of lymphoid follicles, which are represented by lymphocytes and a layer of macrophage cells, were found around the splenic arteries. The stroma of the organ, which is represented by the connective tissue base, arterial, venous and capillary networks, is well developed, there are no hemorrhages. Lymphoid follicles in a state of hyperplasia were detected by an increase in their size due to the proliferation of lymphocytes, as well as an increase in the marginal layer of macrophage cells, which is a sign of the body's immunological reactivity.
Glandular stomach.	A typical glandular structure was found in the glandular stomach. Cells are polygonal in shape, with dark basophilic cytoplasm and a small, rounded central nucleus. The ducts of the glands are slightly dilated, a small amount of catarrhal secretion and desquamated epithelium are found in the lumen. This may be related to the stimulation of the secretory function of the glandular apparatus, which led to minor inflammatory reactions of the mucous membrane due to the action of digestive enzymes on it. The identified changes can be characterized as a positive effect on the digestion process, because the intensive primary enzymatic processing of feed contributes to the improvement of nutrient absorption processes in the intestines. The lamina propria is preserved, the vessels are moderately dilated, there are no hemorrhages. The muscular shell is developed according to age.

Fabric bag	The typical structure of the bursa was revealed, with the development of changes that characterize its age-related involution. Some follicles are well populated by lymphoid cells, while others show mild to moderate lymphoid depletion. The epithelium of the mucous membrane is uneven in some areas. In the follicles, the boundary between the cortical and medullary zones, a decrease in the number of lymphoid cells and the proliferation of reticular cells are clearly visualized. The stroma of the organ is well developed, blood vessels are found in the thickness of the connective tissue framework, there are no hemorrhages.
Intestine	The demarcation of layers is well defined. The villi are intact, preserved throughout, mostly uniform in size and shape. In places, slight desquamation of the surface epithelium was determined. Nuclei of enterocytes are moderately basophilic, rounded, equal in size, located at the basal pole of the cells. Cup-shaped cells are contoured, vacuoles are transparent, rounded. Acidophilic cells are well defined. The crypt lumen is free. The lamina propria is well developed, an increased number of lymphocytes is visualized, which is typical for this type of tissue, and moderate hyperplasia of local lymphoid formations, which indicates the activation of local immunity. Plasma cells and fibroblasts of the lamina propria are evenly distributed and have a contoured, basophilic nucleus. Lacteal lumen is moderate. The muscle plate is intact, the cytoplasm of the cells is oxyphilic, the nuclei are contoured, basophilic. The vessels of the submucosal base are moderately filled with blood. Reticular fibers are oxyphilic, uniformly painted. The number of fibrocytes and lymphocytes in the submucosal base is moderate. The muscle layers are intact, structured, the cell nuclei are well contoured, basophilic, the cytoplasm is oxyphilic, and the layer between the fibers is defined. The color of the drug is uniform. Slight fuchsinophilia is observed in the structures of the submucosal base and muscle layers. There are no undigested remains of food in the lumen.
the second research group	
Name of the body	*Cobb 500 cross broiler chickens, 42 days old*
Liver	The architecture of the liver is preserved. The liver capsule is represented by a thin layer of mesothelial cells, the structure is preserved. A typical structure is visualized, the lumens of the sinusoids are uniformly expanded. The cytoplasm of hepatocytes is light, fine graininess is revealed, which indicates the accumulation of a protein component. The nucleus is rounded, located centrally, the chromatin is clear, intensely colored. Liver stroma without visible pathological changes, microvessels of normal filling. In places, in the lumen of the veins, formed elements of blood were found. Rounded large cells with a dark nucleus and eosinophilic cytoplasm - megakaryocytes - were

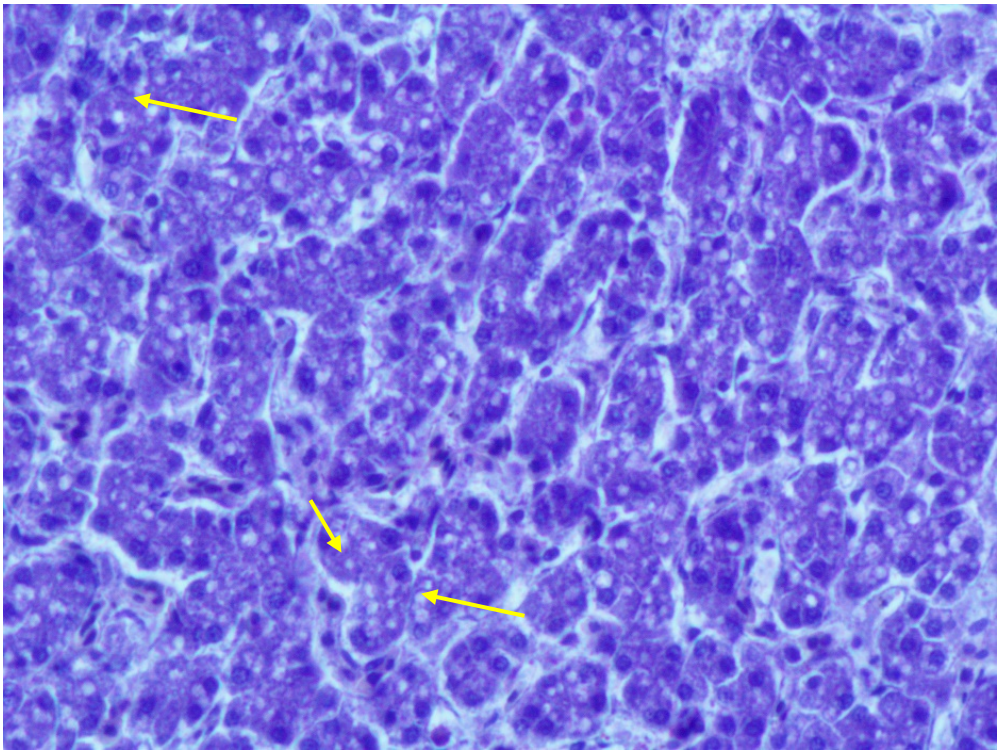
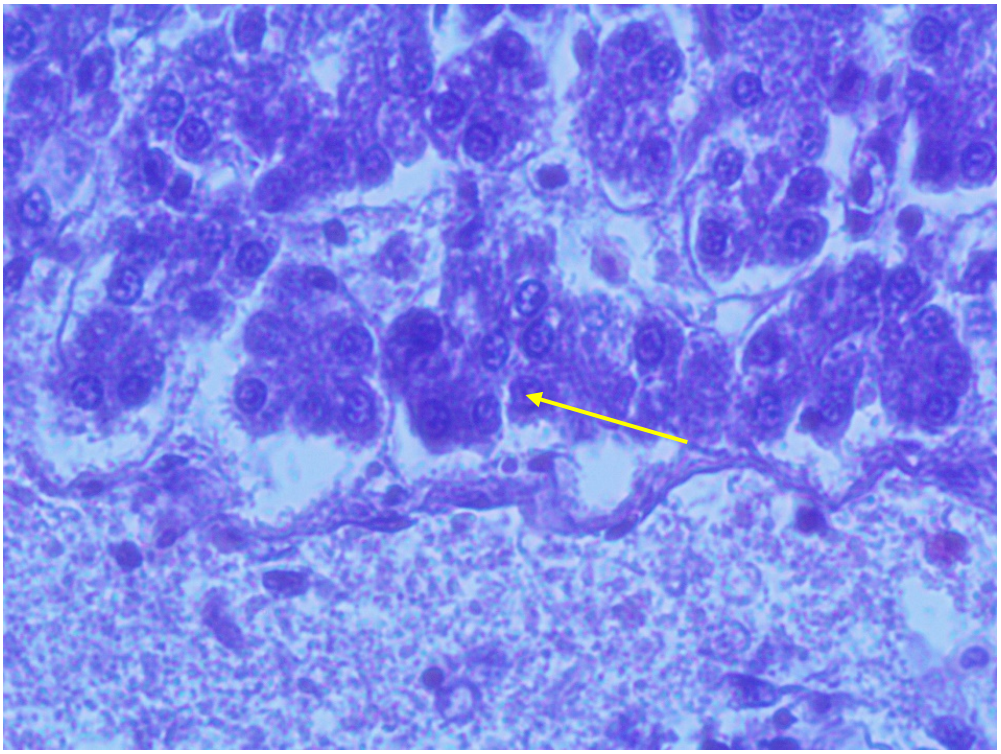
	found around individual hepatic veins. These changes indicate activation of extramedullary hematopoiesis, which may indicate stimulation of erythropoiesis and hemoglobin formation in the bird's body. Bile ducts are well developed, hyperplasia of the epithelium was noted in some places.
Heart	During the examination of the heart muscle, a typical structure was revealed, the myocardium is represented by bundles of muscle fibers, which are connected to each other by a small amount of connective tissue. Cardiac fibers are long, cylindrical, branched, have one oval, centrally located nucleus. In the sarcolemma, a characteristic striation is clearly visible. The structure of the vessels was not changed, a well-developed vessel wall was revealed, which had a typical structure. No pathological changes were found.
Spleen	Examination of the spleen revealed a dense and intact connective tissue capsule of the organ with layers of smooth myocytes. Typical mantle and marginal zones of lymphoid follicles, which are represented by lymphocytes and a layer of macrophage cells, were found around the splenic arteries. The stroma of the organ, which is represented by the connective tissue base, arterial, venous and capillary networks, is well developed, there are no hemorrhages.
Glandular stomach.	A typical glandular structure was found in the glandular stomach. The cells have a typical polygonal shape, with dark basophilic cytoplasm and a small, rounded central nucleus with densely packed chromatin. The ducts of the glands are slightly dilated, a small amount of catarrhal exudate is found in the lumen. The lamina propria is preserved, the vessels are moderately dilated, there are no hemorrhages. The muscular shell is developed according to age.
Fabric bag	Examination of the bursa revealed a typical involution of the organ, a decrease in the number of lymphoid cells was found in the cortical zone, and a clear border between the cerebral and cortical zones was visualized. Kirkov's zone is gradually replaced by light cells - histiocytes. There are no apoptotic bodies, the columnar epithelium on the surface of the leaves of the bursa is preserved, uniform, uniform. Cells of a typical cylindrical shape, with round homogeneous nuclei, light transparent cytoplasm.
Intestine	Histologically, a well-formed intestinal epithelial layer was revealed. Villi are preserved throughout, uniform. Epithelial cells of a typical cylindrical shape, nuclei are located on the basal part, rounded, with clear chromatin, micropili are visualized on the apical surface. The crypts are intact, there are no necrotic cysts. The lamina propria is well developed, the normal number of lymphocytes characteristic for this type of tissue is visualized. The vessels are moderately filled with blood. There are no undigested remains of food in the lumen.

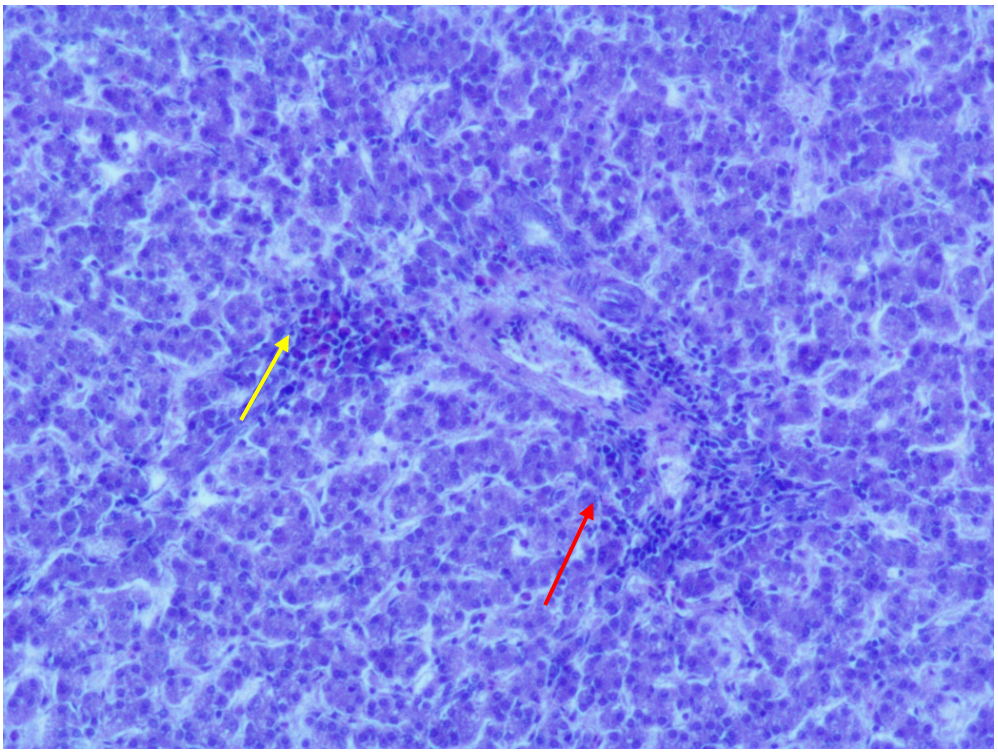
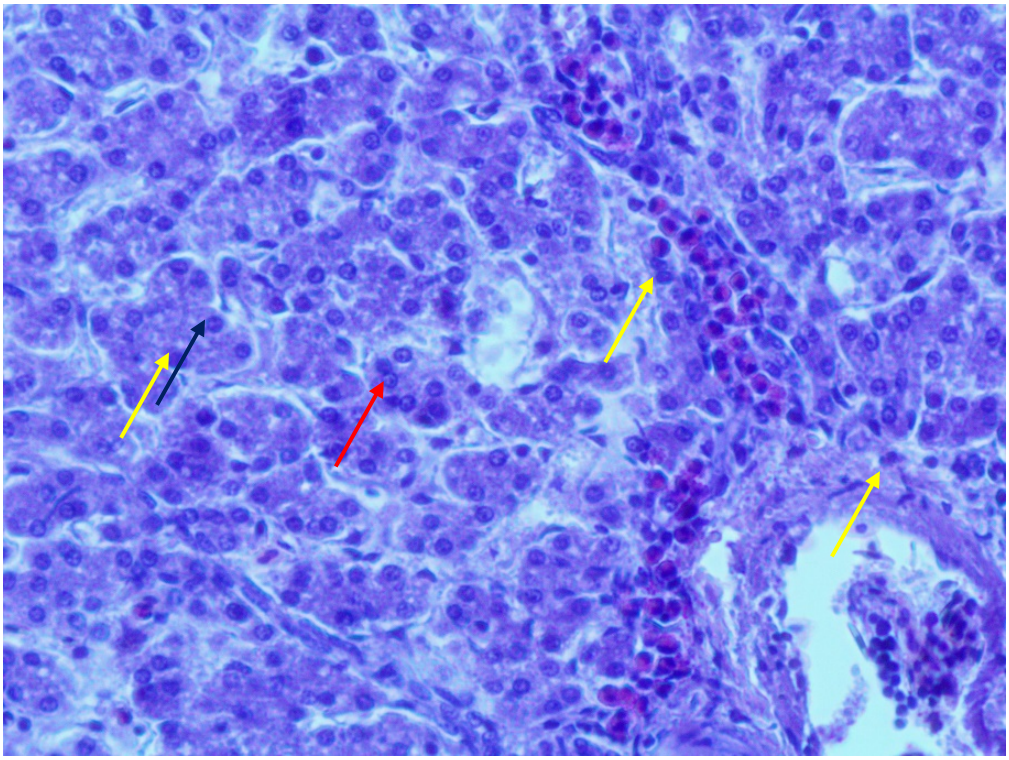
third group (control)	
Name of the body	*Cobb 500 cross broiler chickens, 42 days old*
Liver	The architecture of the liver is disturbed. Areas with unevenly expanded sinusoidal spaces and areas whose morphological state is close to the normal morphofunctional state of the liver are bordered. The organ is diffusely swollen. In the vast majority, the structure of hepatocytes is preserved, rounded light nuclei with clear contours, with evenly spaced chromatin. In some places, the cytoplasm of many cells contains granularity, which is characteristic of the development of protein dystrophy, in part of the hepatocytes, the presence of small transparent intracytoplasmic vacuoles was found, which indicates the development of small-droplet fatty dystrophy of the liver and is a sign of the initial development of the pathological state of the body and a violation of protein and lipid metabolism. Cell edges are not clear, nuclei are rounded, chromatin is coarsely dispersed. The stroma of the organ is swollen, which is especially clearly visualized in the perivascular areas. Partial desquamation of the epithelium of the bile ducts was revealed, which may indicate the development of cholangitis. Perivascular micronecrosis of hepatocytes was detected, which may be a sign of bacterial damage to the liver against the background of secondary bacterial infection.
Heart	During the study of the heart muscle, its typical structure was revealed in the vast majority. The myocardium is represented by bundles of muscle fibers that are connected to each other by a small amount of connective tissue. Cardiac fibers are long, cylindrical, branched, have one oval nucleus with a pronounced nucleolus. In the sarcolemma, a characteristic striation is clearly visible. in a row with changed areas, where defibrillation and thinning of cardiomyocytes were noted, the cytoplasm is unevenly colored. The nuclei acquire a rounded shape, the nucleoli are in a state of karyopyknosis. The wall of the coronary vessels is slightly swollen. There is slight localized lymphocytic infiltration.
Spleen	During the study of the heart muscle, its typical structure was revealed in the vast majority. The myocardium is represented by bundles of muscle fibers that are connected to each other by a small amount of connective tissue. Cardiac fibers are long, cylindrical, branched, have one oval nucleus with a pronounced nucleolus. In the sarcolemma, a characteristic striation is clearly visible. in a row with changed areas, where defibrillation and thinning of cardiomyocytes were noted, the cytoplasm is unevenly colored. The nuclei acquire a rounded shape, the nucleoli are in a state of karyopyknosis. The wall of the coronary vessels is slightly swollen. There is slight localized lymphocytic infiltration

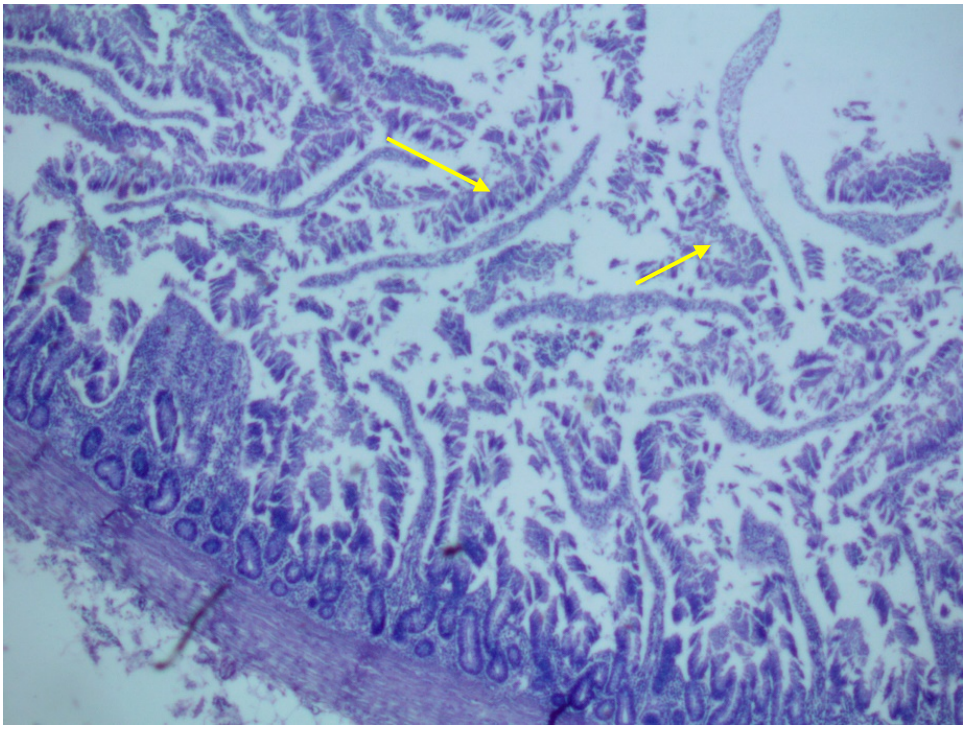
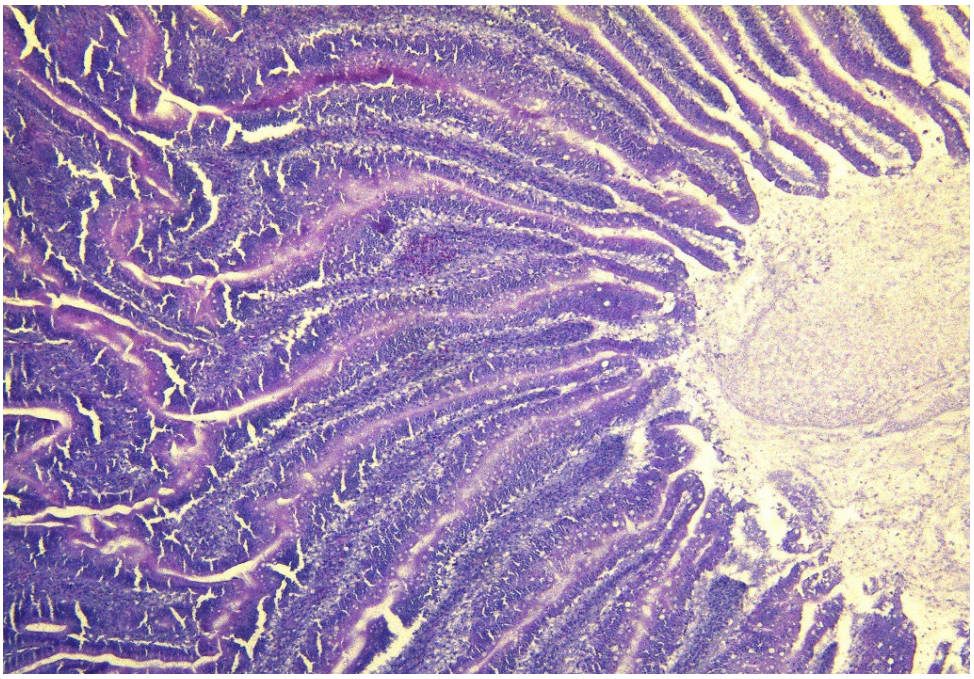
Glandular stomach.	Violation of the glandular structure of the organ was noted. A large amount of desquamated epithelium was found in the lumen of the glands, in some areas it was completely destroyed. The presence of catarrhal exudate with small impurities of erythrocytes was established. The excretory ducts are widened, the basal cells are dark, the nuclei are wrinkled, the cytoplasm is granular, unevenly colored. The stroma of the organ is swollen.
Fabric bag	An early involution of the bursa was detected, which was characterized by a significant decrease in the amount of lymphoid tissue and was visualized in the form of an erasure of the boundary between the cerebral and cortical zones. Lymphoid tissue was presented in the form of a small thin strip in the cortical zone, lymphoid cells were small, round in shape, with a large dark nucleus and a thin strip of cytoplasm. However, apoptotic bodies were found in the cerebral part, pyknotic nuclei of lymphocytes and proliferation of connective tissue stroma at the border between the cerebral and cortical parts were detected, which may indicate the development of a weakly expressed immunosuppressive state as a result of early exhaustion of the lymphoid organ. Lymphoid tissue was replaced by macrophages and reticular cells. Plasma cells were also detected, which are normally not visualized during natural involution. The presence of plasma cells may indicate the exhaustion of the immune system as a result of a systemic bacterial infection. The vessels are well developed, no hemodynamic disorders were detected.
Intestine	Histologically, a well-formed intestinal epithelial layer was revealed. Villi are preserved, mostly not uniform in size, polymorphic. Epithelial desquamation, sometimes with areas of necrosis, was detected. The phenomena of karyorrhexis and karyopyknosis were visualized in the preserved cells. Goblet cells are significantly expanded, filled with mucus. Blood vessels are dilated, their wall is thickened, small diffuse hemorrhages were observed. The lamina propria is diffusely swollen, massively infiltrated with lymphocytes. Destroyed fragments of villi, desquamated epithelium, clusters of rod-shaped bacteria and multiple undigested remains of plant food were observed in the intestinal lumen. The muscle plate is slightly swollen, but preserved. The vessels of the submucosal base are moderately filled with blood. Reticular fibers are unevenly colored. The detected morphological changes indicate the development of a sluggish course of bacterial enterocolitis, which was accompanied by digestive dysfunction.

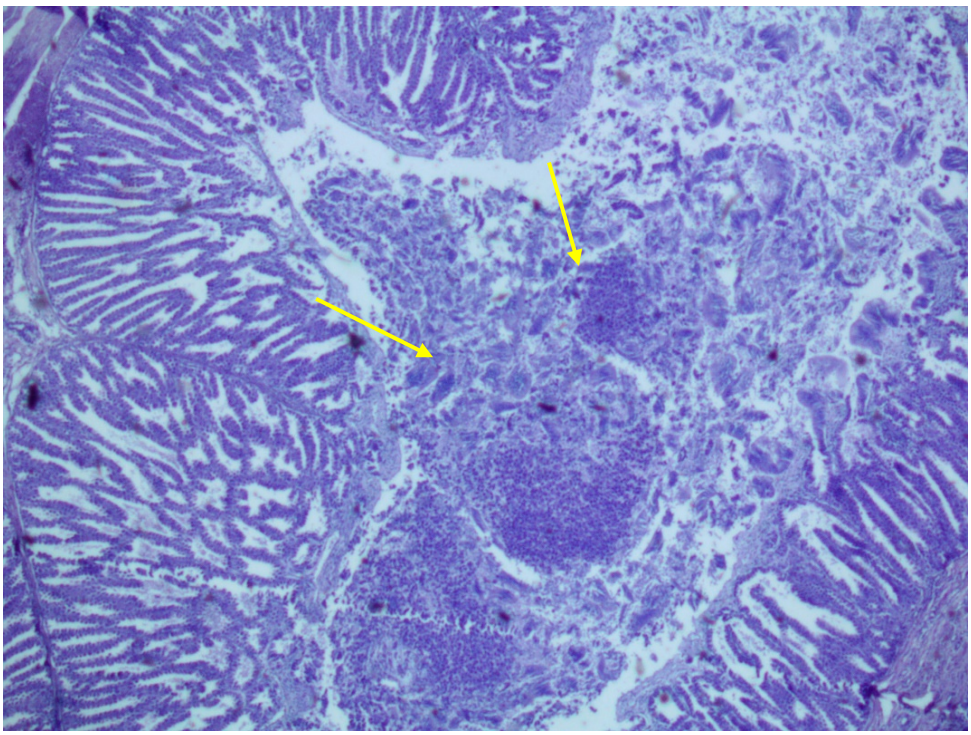
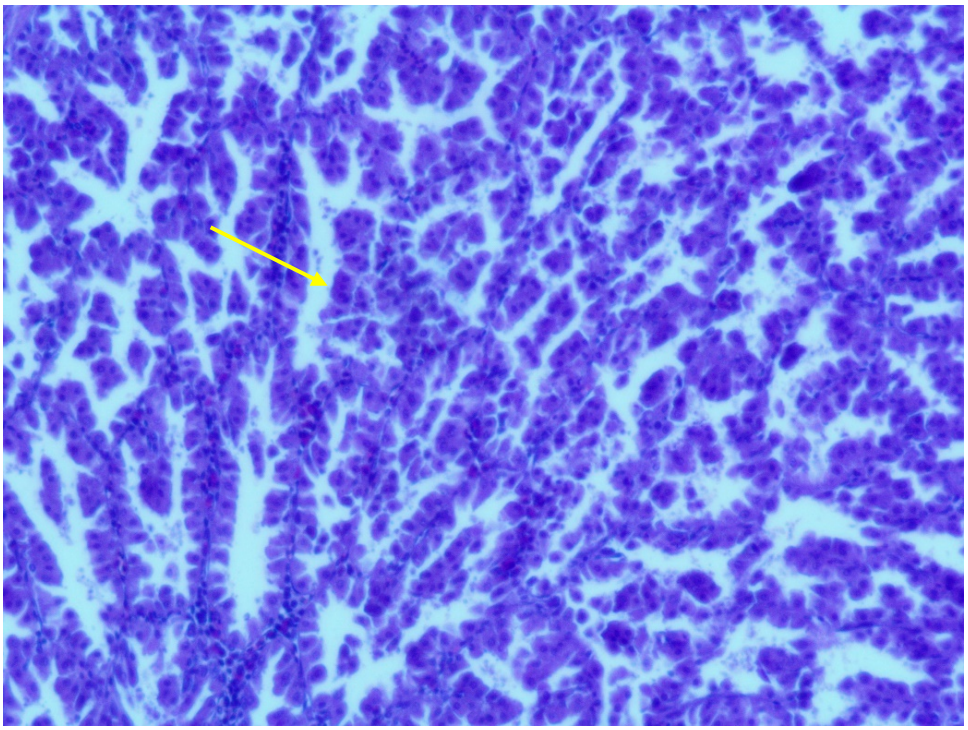
Small and large intestines - degree of filling with chyme, feces, gases, intestinal patency, development of peri-intestinal fat, intestinal contents, characteristics of the wall (mucous, muscular and serous layers).

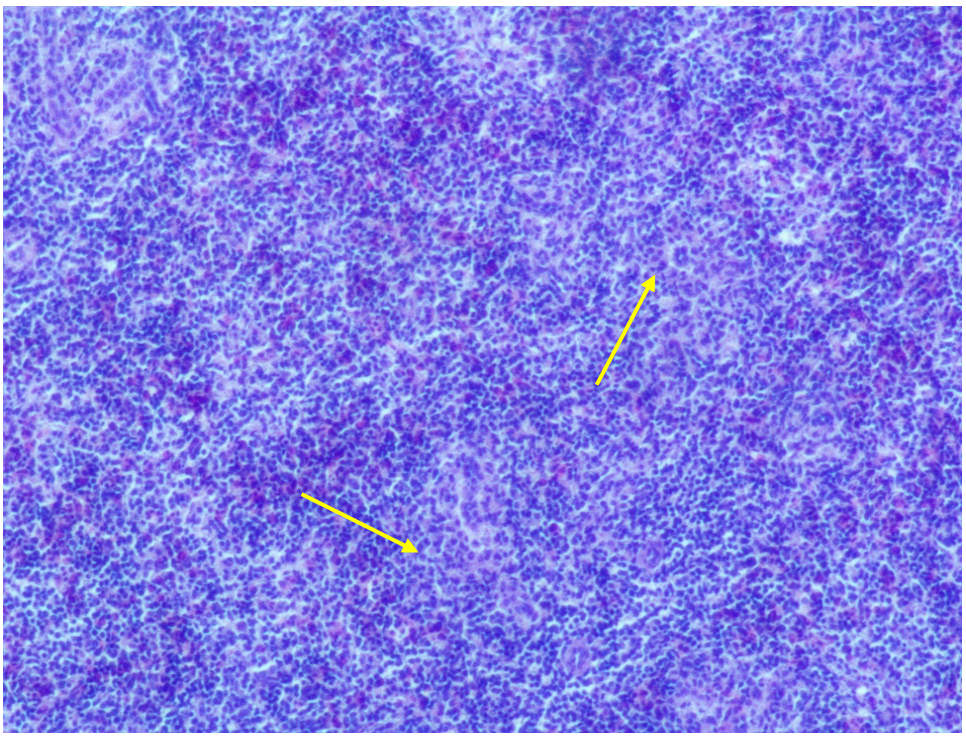
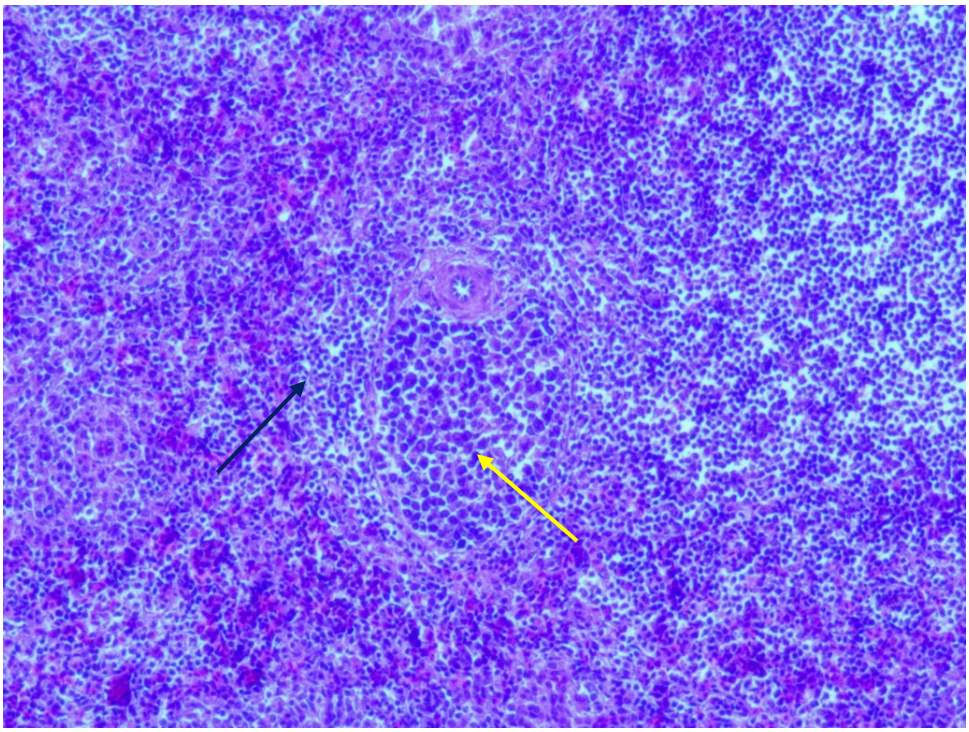
Kidneys – structural volume, consistency, homogeneity of color, state of blood vessels, amount and nature of fat in perirenal tissue, ureters.

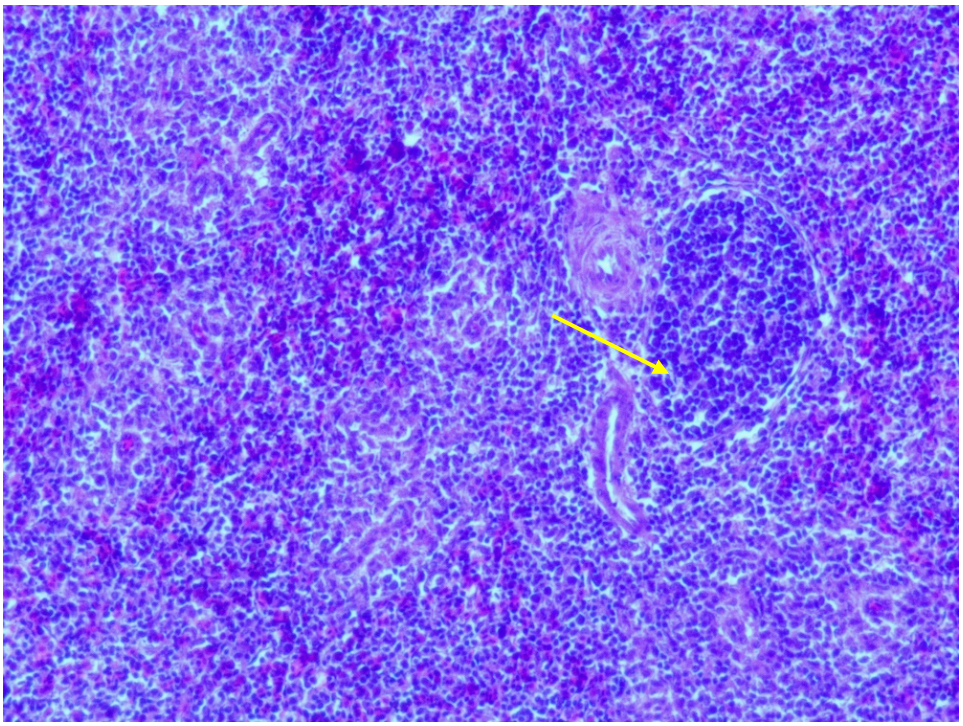
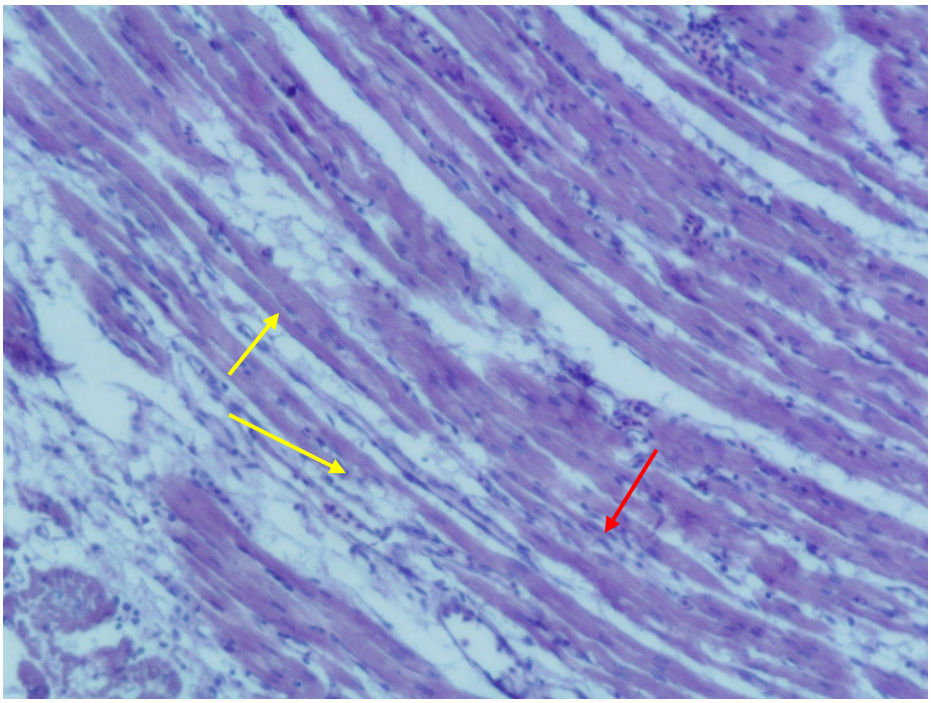
Research group	Liver Morphological characteristics of the sample Staining with hematoxylin and eosin
CONTROL	 Fig. 1. Liver of a broiler chicken of the control group. Hematoxylin and eosin. Magnification x20. Small droplet fatty dystrophy of hepatocytes.  Fig. 2. Liver of a broiler chicken of the control group. Hematoxylin and eosin. Magnification x40. Thinning of the blood vessel wall, perivascular edema, hepatocyte dystrophy.

Experiment 1	 Fig. 3. Liver of a broiler chicken of experimental group 1. Hematoxylin and eosin. Magnification x10. Moderate perivascular lymphocytic infiltration (red arrow), megakaryocytes (yellow arrow).
Experiment 2	 Fig. 4. Liver of a broiler chicken of experimental experimental group 2. Hematoxylin and eosin. Magnification x20. Extramedullary hematopoiesis and megakaryocytes (yellow arrow), granular cytoplasm (black arrow), intensively stained nuclear chromatin (red arrow).

Research group	Intestine morphological characteristics of the sample Staining with hematoxylin and eosin
CONTROL	 Fig. 5. Duodenum of a broiler chicken of the control group. Hematoxylin and eosin. Magnification x10. Desquamation of villi.
the first research group	 Fig. 6. Duodenum of experimental group 1 broiler chicken. Hematoxylin and eosin. Magnification x10. Well-developed identical villi with preserved covering epithelium are visualized.

Research group	Glandular stomach Morphological characteristics of the sample Staining with hematoxylin and eosin
CONTROL	 Fig. 7. Glandular stomach of a broiler chicken of the control group. Hematoxylin and eosin. Magnification x10. Desquamated epithelium and catarrhal exudate (yellow arrows) with impurities of erythrocytes in the lumen of the glands, signs of the development of proventriculitis.
the second research group	 Fig. 8. Glandular stomach of a broiler chicken of experimental group 2. Hematoxylin and eosin. Magnification x30. Secretory basophilic cells (yellow arrow).

Research group	Spleen Morphological characteristics of the sample Staining with hematoxylin and eosin
CONTROL	 Fig. 9. Spleen of broiler chicken of experimental control group. Hematoxylin and eosin. Magnification x10. Depletion of lymphoid follicles (yellow arrow).
the first research group	 Fig. 10. Spleen of a broiler chicken of experimental group 1. Hematoxylin and eosin. Magnification x10. Hyperplasia of the lymphoid nodule in the perimantial zone (yellow arrow), proliferation of macrophage cells (black arrow).

the second research group	 Fig. 11. Spleen of a broiler chicken of experimental group 2. Hematoxylin and eosin. Magnification x10. Hyperplasia of the lymphoid nodule (yellow arrow).
Research group	**Heart** **Morphological characteristics of the sample** **Staining with hematoxylin and eosin**
CONTROL	 Fig. 12. Heart muscle of broiler chicken of the control group. Hematoxylin and eosin. Magnification x20. Thinned fibers (yellow arrow), lymphocytic infiltration (red arrow), development of myocardiodystrophy.

Conclusions:

1. Histological examination of the liver of the first research group of 42 day-old broiler chickens revealed minor areas of perivascular lymphoid infiltration as a result of the hepatoprotective effect. The presence of light granularity of the cytoplasm of hepatocytes may be associated with the activation of protein metabolism in the body. Complex activation of individual groups of hepatocytes, focal perivascular lymphoid infiltration, hyperplasia of the epithelium of the bile ducts characterizes a pronounced cholinergic and choleretic effect (reaction). Histological examination of the liver of the second experimental group of 42 day-old broiler chickens revealed activation of extramedullary hematopoiesis, which may indicate stimulation of erythropoiesis and hemoglobin formation in the bird's body.

2. Histological examination of the liver of a control group of 42 day-old broiler chickens revealed the development of distinct microscopic changes that may be a sign of bacterial liver damage against the background of the development of secondary bacterial infection, as well as the development of cholangitis and hepatitis.

3. Histological examination of the heart of a control group of 42 day-old broiler chickens revealed the presence of changes indicating the development of myocardial dystrophy.

4. Histological examination of the spleen of the first experimental group of 42 day-old broiler chickens revealed hyperplasia of lymphoid follicles, which is a sign of the body's immunological reactivity. Histological examination of the spleens of the control group of 42 day-old broiler chickens revealed changes that may indicate a weakening of the immune system, which was preceded by an active immune response.Usually, the detected changes are accompanied by a slow course of systemic bacterial infection of the body, which leads to a significant weakening of immunocompetent organs.

5. Histological examination of the glandular stomach of the first experimental group of 42 day-old broiler chickens revealed activation of the secretory function of the glandular apparatus, which can be characterized as a positive effect on the digestion process, because intensive primary enzymatic processing of feed contributes to the improvement of nutrient absorption processes in the intestines. The process of digestion and fermentation in the gastrointestinal tract is activated.

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Анотація. *Наведені результати дослідження препаратів імуно-коригувальних та біоцидної дій, які можна ефективно використовувати в умовах птахівничого господарства для оптимізації імунних процесів, посилення природної резистентності та імунологічної реактивності з метою підвищення продуктивності і стійкості птиці до захворювань. Встановлено, що за гістологічного дослідження печінки першої дослідної групи 42 добових курчат-бройлерів було виявлено незначні ділянки периваскулярної лімфоїдної інфільтрації, як наслідок гепатопротекторної дії. Наявність легкої зернистості цитоплазми гепатоцитів*

може бути пов'язана із активацією білкового обміну в організмі. Комплексна активація окремих груп гепатоцитів, вогнищева периваскулярна лімфоїдна інфільтрація, гіперплазія епітелію жовчних каналів характеризує виражену холінокінетичною і холеретичною дію (реакцію). За гістологічного дослідження печінки другої дослідної групи 42 добових курчат-бройлерів було виявлено активацію екстрамедулярного гемопоезу, що може вказувати на стимуляцію еритропоезу та гемоглобіноутворення в організмі птиці. За гістологічного дослідження печінки контрольної групи 42 добових курчат-бройлерів було виявлено розвиток виразних мікроскопічних змін, які можуть бути ознакою бактеріального ураження печінки, на фоні розвитку вторинної бактеріальної інфекції, а також розвитку холангіту та гепатиту. За гістологічного дослідження серця контрольної групи 42 добових курчат-бройлерів було встановлено наявність змін, які вказують на розвиток міокардіодистрофії. За гістологічного дослідження селезінки першої дослідної групи 42 добових курчат-бройлерів було виявлено гіперплазію лімфоїдних фолікул, що є ознакою імунологічної реактивності організму. За гістологічного дослідження селезінки контрольної групи 42 добових курчат-бройлерів відмічали зміни, які можуть свідчити про ослаблення імунної системи, чому передувала активна імунна відповідь. Зазвичай, виявлені зміни супроводжуються в'ялим перебігом системної бактеріальної інфекції організму, що призводить до значного ослаблення імунокомпетентних органів. За гістологічного дослідження залозистого шлунку першої дослідної групи 42 добових курчат-бройлерів було виявлено активацію секреторної функції залозистого апарату, що можна охарактеризувати як позитивний вплив на процес травлення, адже інтенсивна первинна ферментативна обробка корму сприяє покращенню процесів всмоктування поживних речовин у кишечнику. Активізується процес травлення і ферментизації в шлунково-кишковому каналі. У контрольної групи було виявлено зміни, що можуть свідчити про розвиток провентрикуліту. Виявлені зміни можуть свідчити про розвиток запальних процесів, які можуть виникати в наслідок розвитку системної бактеріальної інфекції. За гістологічного дослідження Фабрицієвої бурси контрольної групи 42 добових курчат-бройлерів встановлення імуносупресивного стану в наслідок раннього виснаження лімфоїдного органу в наслідок розвитку системної бактеріальної інфекції. За гістологічного дослідження кишечника першої дослідної групи 42 добових курчат-бройлерів виявляли гіперплазію місцевих лімфоїдних утворень, що свідчить про імунореактивність. За гістологічного дослідження кишечника контрольної групи 42 добових курчат-бройлерів було встановлено наявність змін, які вказують на розвиток в'ялого перебігу бактеріального ентероколіту, що супроводжувався дисфункцією травлення.

Ключові слова: *лімфоїдний фолікул, курчата-бройлери, гіперплазія, імунореактивність, ферментизація, пробіотик, біоцид.*