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INFLUENCE OF SELENIUM COMPOUNDS ON HISTOLOGICAL INDICATORS OF QUAILS IN THE AGE ASPECT

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Agricultural production is affected by man-made load, accompanied by the scattering of toxic elements, heavy metals in particular [13]. Their entry into the body may be accompanied by a cumulative effect, impaired metabolism of trace elements and the functioning of the tricarboxylic acid cycle, inhibition of hemoglobin synthesis, changes in the amino acid composition of the body, metabolic disorders in general [16]. Heavy metals bind to HS-groups of proteins, inhibit the activity of enzymes and form complex compounds with organic and inorganic ligands, provoke the development of oxidative stress [14].

The kidneys play an important role in maintaining homeostasis, removing non-volatile end products of metabolism, foreign substances, and products of nitrogen metabolism from the blood. Disorders of renal metabolism under stress factors of various origins cause disorders of the whole organism, hormonal disorders, egg-laying disorders, decreased productivity and live weight of birds [6].

Selenium (Se) is a trace element involved in the work of selenoproteins involved in the regulation of thyroid hormone metabolism, enzymatic antioxidant protection and the immune system [10; 12]. Element deficiency has been linked to cardiovascular disease, risk of viral infections, and increased risk of mortality [15]. Low serum levels are common in acute kidney damage or chronic kidney disease [12], which are associated with a risk of death from coronary heart disease.

The morphology of mammalian kidneys has been widely studied [2; 4], however, in birds the histological and morphological parameters of the organ are insufficiently disclosed [5]. The histological structure of quail kidneys before and during egg-laying was studied, the morphometric study of the obtained preparations in the age aspect and at the receipt of selenium preparations was carried out.

The material for this study was 40 quails of the breed Pharaoh, kept in the vivarium of BTsNAU. Quails received a balanced diet in terms of nutrition and

energy value. Experimental quails were divided into two age groups: 1 group was taken before egg production (4 weeks), 2 group was taken at its beginning (8 weeks). After decapitation, the birds were selected kidneys for examination. Tissue samples were fixed in 10–15% formalin solution and processed by traditional histological methods to make celloidine sections. The sections of tissue samples were stained with hematoxylin-eosin and the diameter and area of the lumen of blood vessels, straight renal tubules and glomeruli were determined.

The urinary system in birds has morphological features: the malpighian glomerulus are slightly branched, there are no tortuous tubules of the second order and renal papillae; nephrons are located in both the cortical and cerebral layers; renal pelvis is absent; no bladder; the ureters begin in the renal lobes and end in the cloaca. Bird kidneys are supplied with blood from two sources: arterial - from the aorta and venous - through the renoportal system.

The kidneys of birds are dark red, oblong, as if pressed into the ventral recesses of the lumbosacral spine and glomerulus. Urinary and urinary areas are indistinct. The body of kidney is divided into middle, front and back parts. The histological section of the renal parenchyma shows incised renal tubules, the walls of which consist of epithelium, next to which on the section of the cortical substance in the field of view are numerous Malpighi bodies (vascular glomerulus surrounded by the Shumlyansky-Bowman capsule).

Normally, the kidney has a typical structure. The structural and functional unit of the kidney is the nephron. The nephron wall is constructed of a single layer of epithelium. The nuclei have well-defined boundaries. The renal vascular glomerulus has a typical structure.

The diameter of the glomeruli in the kidneys of one month old quails is 5.52±0.01 μm, at 2 months of age is 7.06±0.01 μm. The cross-sectional area of the glomeruli is 24.67±0.08 and 40.86±0.12 μm^2 at 1 and 2 months of age, respectively. The diameter of the renal vessels in one-month-old quails and the area of the vascular lumen are 18.46±0.01 μm and 309.08±0.28 μm^2 and decrease by almost 20% during the next month of life of the bird, while the diameter and area of the lumen of the direct tubules is growing. The renal tubules are sensitive to damage. They contain a large number of lysosomes, more susceptible to the activation of reactions of lipid peroxidation, ischemia, protein overload of the nephron [7].

Despite the toxicity of high levels of selenium (Se), the element is a part of selenocysteines, which control important enzymatic reactions [3]. Se-dependent diseases are manifested as impaired reproductive function, growth inhibition, white muscle disease [15]. Dietary addition of selenium in yeast reduces the negative effects of exotoxicants, accelerates the rate of glomerular filtration, tubular reabsorption [1], reduces vascular degeneration of the renal tubules [8]. Addition of selenium in yeast normalizes the level of lipid peroxidation, normalizes the activity of antioxidant enzymes [10], reduces bird mortality, liver damage and immunosuppression [15], protects kidney cells from oxidative stress [11] and inhibits blockade of the cell cycle [9].

In the control group, the histological structure was normal, manifested as normal epithelial cells of the renal tubules with a homogeneous plasma and a well-defined

tubular renal cavity. A large number of mitochondria and a rough endoplasmic reticulum were observed in the cytoplasm of the proximal convoluted tubules of epithelial cells. In the groups receiving selenium preparations, the kidneys had no obvious changes compared to the control group.

Our studies allowed us to establish the structural organization of quail kidneys before and during egg laying, to determine the size of some anatomical structures of the kidneys in terms of age and the receipt of selenium preparations. The results of the study of histochemical changes in the kidneys of quails can be used in further research on this topic and in classes on histology and histochemistry.

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