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TABLE OF CONTENTS

AGRICULTURAL SCIENCES

1. *Вискуб Р. С., Скнипа Н. Л.* 13
ФОРМУВАННЯ ПОКАЗНИКІВ ЯКОСТІ ЗЕРНА ЯЧМЕНЮ
ЯРОГО НА РІЗНИХ ФОНАХ ЖИВЛЕННЯ
2. *Мальон А. Л.* 17
ТОВАРНА СТРУКТУРА СТИГЛИХ ПОХІДНИХ БУКОВИХ
ДЕРЕВОСТАНІВ В ГОРГАНАХ НА ПРИКЛАДІ ВИГОДСЬКОГО
ЛІСОВОГО ГОСПОДАРСТВА
3. *Маріуца А. Е., Борисенко Н. О., Оборський В. П.* 21
АНАЛІЗ ГЕНЕТИЧНОЇ СТРУКТУРИ АНТОНІНСЬКО–
ЗОЗУЛЕНЕЦЬКОГО ВНУТРІШНЬОПОРОДНОГО ТИПУ
ЛУСКАТОЇ ТА РАМЧАСТОЇ ПОРІД КОРОПА ІЗ
ЗАСТОСУВАННЯМ ISSR-МАРКЕРІВ
4. *Супрунець А. В.* 26
САНИТАРНИЙ СТАН ЛІСІВ У ФІЛІЇ «КЛЕСІВСЬКЕ ЛІСОВЕ
ГОСПОДАРСТВО»

BIOLOGICAL SCIENCES

5. *Binate Gaoussou, Shikhaliyev Namik, Qacar Ayten, Ahmadova Nigar, Shafiyeva Samira, Maharramov Abel, Ganbarov Khudaverdi* 28
STUDY OF ARYLHYDRAZONES OF α -KETO ESTERS AGAINST
FOUR GRAM-NEGATIVE PATHOGENIC BACTERIA
6. *Onufriiev O., Sirenko A.* 33
ABNORMALITIES OF CENTROMERES AS A CAUSE OF
GENOME INSTABILITY OF CANCER CELLS IN CHILDREN
WITH ACUTE MYELOBLASTIC LEUKEMIA
7. *Vasyliuk O., Skrotskyi S., Khomenko L.* 39
ANTIBIOTIC SENSITIVITY OF STRAINS OF LACTIC ACID
BACTERIA ISOLATED FROM FRESHWATER FISH

MEDICAL SCIENCES

8. *Aravitskiy E. O.* 43
FEATURES OF THE DYNAMICS OF THE CELLULAR
COMPOSITION OF THE THYMIC SUBCAPSULAR ZONE IN THE
POSTNATAL PERIOD AFTER INTRAUTERINE EXPOSURE TO
STAPHYLOCOCCAL ANATOXIN
9. *Khubetova I.* 45
LIFE QUALITY IN PATIENTS WITH PARKINSON'S DISEASE.
ASSESSMENT TOOLS
10. *Obolonska O., Samoilenko V.* 49
PECULIARITIES OF RENAL BLOOD FLOW IN CHILDREN WITH
RECURRENT KIDNEY DISEASES

MEDICAL SCIENCES

FEATURES OF THE DYNAMICS OF THE CELLULAR COMPOSITION OF THE THYMIC SUBCAPSULAR ZONE IN THE POSTNATAL PERIOD AFTER INTRAUTERINE EXPOSURE TO STAPHYLOCOCCAL ANATOXIN

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Introductions: the impact of the thymus and its immunoendocrine interactions with other organs is particularly significant in childhood, ensuring the normal development of the child, maintaining immune reactivity, and facilitating adaptation to various environmental factors. It is believed that disturbances in the formation and maturation of the fetal immune system stem from its suppression due to excessive antigenic stimulation by infectious factors and other foreign antigens transmitted from the mother, particularly when there is a disruption in the hemato-placental barrier. Thymus formation disorders may serve as the basis for the development of autoimmune, allergic, and infectious diseases in early childhood.

Aim: to identify the features of the dynamics of the relative quantity of cortical substance lymphocytes in the thymus of rats during the first month of life after prenatal exposure to staphylococcal anatoxin.

Materials and methods: the study involved the examination of the thymus glands of 144 non-linear white rats on days 1, 2, 3, 5, 9, 14, 21, and 30 of postnatal life, divided into three groups: group I - 48 intact animals, group II - 48 animals receiving intrauterine administration of 0.05 ml of staphylococcal anatoxin (diluted 1:10) on the 18th day through the maternal-chamber, intra-amniotic, and intrafetal routes, and group III - 48 control animals receiving 0.05 ml of 0.9% NaCl.

Preparations were stained with Schiff's reagent with hematoxylin nuclear counterstaining. Microscopy was performed using a Carl Zeiss Primo Star microscope (Germany) at immersion magnification. Cell counting, including lymphocytes of different diameters and lymphoblasts, was done using the ImageJ program. Data were processed using variation statistics methods in the "STATISTICA 10.0" program. The reliability of the results was assessed using the Student's t-test ($p < 0.05$).

Results and discussion: In the experimental group, a higher relative quantity of small lymphocytes in the subcapsular zone is observed from the 2nd ($45.43 \pm 1.14\%$) to the 5th ($47.14 \pm 1.53\%$) day, and after the 21st day ($53.12 \pm 1.62\%$) of life compared to the intact group ($42.04 \pm 1.26\%$, $39.13 \pm 1.27\%$, and $49.01 \pm 1.17\%$, respectively). Meanwhile, the proportion of medium lymphocytes from the 2nd ($16.58 \pm 1.37\%$) to the 9th day ($11.51 \pm 1.09\%$) is significantly lower compared to the intact group ($21.56 \pm 1.08\%$ and $14.19 \pm 1.04\%$, respectively). The same pattern is observed among the population of large lymphocytes: from the 5th ($4.35 \pm 0.52\%$) to the 14th ($4.32 \pm 0.51\%$) day, their proportion in the experimental group is significantly lower than in the intact group of animals ($7.95 \pm 0.47\%$ and $6.21 \pm 0.79\%$, respectively).

Conclusions: The mentioned features of the cellular composition of the morpho-functional zones of the thymus in the experimental group of animals likely reflect the acceleration of thymocyte proliferation and maturation processes and the earlier release of these cells into the periphery.