



CHARACTERISTICS OF DETERMINING THE DEGREE OF EXPERIMENTAL THYMECTOMY EFFECT ON BONE MARROW

Sharipova Riboba Gulomalievna

Bukhara State Medical Institute

<https://doi.org/10.5281/zenodo.17542539>

ARTICLE INFO

Received: 29th October 2025

Accepted: 30th October 2025

Online: 31st October 2025

KEYWORDS

was to compare the cytogenetic changes in the bone marrow of white-bred rats after thymectomy and to assess the results adequately.

ABSTRACT

The purpose of the study The aim of the experiment was to compare cytogenetic changes in the bone marrow of white outbred rats against the background of thymectomy and to adequately evaluate the results obtained. A total of 80 3-month-old white outbred rats weighing 160-180 g were randomly selected for the study. Against the background of thymectomy, the proliferation activity of bone marrow cells, a decrease in the number of metaphases and prophases, an increase in mitotic pathologies, and an increase in apoptosis were proven to have a negative effect on bone marrow cells at the molecular level, which allowed for cytogenetic changes, an increase in cytotoxic effect, and an increase in the apoptosis process increased the likelihood that changes in the DNA of cells would occur

The purpose of the study The aim of the experiment was to compare cytogenetic changes in the bone marrow of white outbred rats against the background of thymectomy and to adequately evaluate the results obtained. A total of 80 3-month-old white outbred rats weighing 160-180 g were randomly selected for the study. Against the background of thymectomy, the proliferation activity of bone marrow cells, a decrease in the number of metaphases and prophases, an increase in mitotic pathologies, and an increase in apoptosis were proven to have a negative effect on bone marrow cells at the molecular level, which allowed for cytogenetic changes, an increase in cytotoxic effect, and an increase in the apoptosis process increased the likelihood that changes in the DNA of cells would occur.

The aim of the research was to compare the cytogenetic changes in the bone marrow of white-bred rats after thymectomy and to assess the results adequately.

Materials and methods. A total of 80 3-month-old white outbred rats weighing 160-180 g were randomly selected for the study.

Thymectomy in white-bred rats was performed according to Victoria R. Rendell et al. This method reliably resulted in complete thymectomy, minimized operative time, and minimized periprocedural mortality.

All laboratory animals were divided into 4 representative experimental groups: Main group 1 - thymectomized white inbred rats that did not receive "Lactopropolis-AWL", n=20; Main group 2 - thymectomized white inbred rats that received "Lactopropolis-AWL", n=20; Comparison group - thymectomized white inbred rats that received ASD-2, n=20; Control group - intact white inbred rats that did not receive thymectomized, probiotics and biostimulants, n=20.

For cytogenetic research, bone marrow was extracted from tubular bones during euthanasia of purebred rats, and cytogenetic changes were determined using a direct method. In each sample, 15-25 cells with metaphase plates were counted under a microscope, and the obtained numbers were analyzed. The number of dividing cells in the preparations was counted under a microscope and the mitotic index (MI) was calculated using the formula: $MI = \text{Number of dividing cells} / 1000 \times 100$.

The obtained results and their discussion. The study of the effect of thymectomy on bone marrow cytogenetic studies showed that the activity of bone marrow cell proliferation in intact animals was 36.67%, while after thymectomy this parameter was on average 28.61%, the decrease in activity was significant and amounted to 1.28 times.

The study found that the number of metaphases in intact white rats averaged 51.68%, while in thymectomized rats it was 1.43 times lower, or a 15.54% reduction.

Thus, the detection and assessment of the level of cytogenetic changes in bone marrow cells after thymectomy showed that in the comparison group (thymectomy + ASD-2) 3 of the 7 studied indicators (42.86%) were within the parameters of intact animals. These were the activity of bone marrow cell proliferation, the number of prophases and cell death by the type of necrosis, the difference between which was 0.92-1.82%. The number of metaphases in the comparison group was found to be 1.13 times or 5.81% lower than in intact animals, and the number of metaphase plates was 1.57 times or 28.91% lower than in intact animals without pathology. Mitotic pathologies remained high (difference 2.17 times or 26.39%). The high incidence of mitotic pathologies was associated with the performed thymectomy. The increase in apoptosis also applied to the comparison group (a difference of 2.93 times or 10.03% in favor of this group). Thus, cytogenetic changes in the bone marrow of laboratory animals of the comparison group were relatively weak, the cytotoxic effect was less developed, structural changes in chromosomes were not detected, and it was recognized that the high rate of cell death by the type of apoptosis could also lead to changes in DNA.

Conclusion: Of the 7 cytogenetic parameters in the bone marrow of thymectomized white non-bred rats, 4 were significantly lower than those in intact laboratory animals, 2 were higher, associated with a pathological condition, and no difference was detected in 1.

In laboratory animals that underwent thymectomy and biocorrection (main group 2), the trend of changes was similar to that in the main group 1 (thymectomy + no biocorrection), and was different from the intact ones, negative cytogenetic changes were observed. Cytogenetic changes as a result of the cytotoxic effect were of a high degree, the intensity of changes was different compared to the main group 1, and changed in different directions. This result indicated a clear ineffectiveness of the drug (Lactopropolis-AWL).