



ERYTHROPOIESIS IN EXPERIMENTAL INTESTINAL SCARRING: AGE-RELATED CHARACTERISTICS AND CORRECTION WITH SILYMARIN

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Relevance. Cicatricial and sclerotic processes of the intestine are accompanied by persistent inflammation and structural and functional impairment of the intestinal wall, exerting systemic effects on metabolic and hematopoietic pathways. Evaluating the state of erythropoiesis is of particular significance, as chronic inflammation and malabsorption of essential nutrients can disrupt red blood cell indices and suppress the functional activity of the bone marrow. Furthermore, the severity of these disturbances may depend on the animal's age. Investigating the age-related dynamics of erythropoiesis parameters and their modulation by silymarin enables an objective assessment of both the systemic sequelae of intestinal scarring and the efficacy of targeted therapeutic correction.

Aim of the study. To investigate age-related features of erythropoiesis in outbred white rats during experimental intestinal scarring and to evaluate the corrective efficacy of silymarin extract on the identified alterations.

Materials and methods. The study was conducted on 180 outbred white rats aged 4, 7, and 10 months, maintained under standard vivarium conditions. The animals were divided into three groups: Group I intact control (n=30; 10 rats of each age group), Group II experimental group with modeled intestinal scarring (n=90; 30 rats of each age group) and Group III experimental group with intestinal scarring followed by correction with silymarin extract (n=60; 20 rats of each age group). To assess the state of the erythropoietic system, peripheral blood parameters were analyzed: red blood cell (RBC) count, hemoglobin concentration, hematocrit, reticulocyte count, mean corpuscular volume (MCV), and mean corpuscular hemoglobin (MCH).

Results. Experimental intestinal scarring induced a decline in erythropoiesis parameters, which was most pronounced in older animals. In 4-month-old rats, the RBC count decreased from $7,70 \pm 0,20 \times 10^{12}/L$ in the



control to $6,95 \pm 0,18 \times 10^{12}/L$ in the scarring group; in 7-month-old rats, from $7,42 \pm 0,18$ to $6,70 \pm 0,16 \times 10^{12}/L$; and in 10-month-old rats, from $7,18 \pm 0,17$ to $6,42 \pm 0,16 \times 10^{12}/L$.

A parallel pattern was observed for hemoglobin: its level decreased from $148,2 \pm 3,0$ to $137,4 \pm 2,8$ g/L, from $147,5 \pm 2,9$ to $134,8 \pm 2,7$ g/L, and from $143,9 \pm 3,1$ to $130,6 \pm 2,9$ g/L, respectively. Hematocrit dropped from $44,1 \pm 0,8$ to $40,9 \pm 0,7\%$, from $44,0 \pm 0,8$ to $40,1 \pm 0,7\%$, and from $42,8 \pm 0,9$ to $39,3 \pm 0,8\%$, respectively. The reticulocyte count demonstrated the most informative changes, declining from $2,80 \pm 0,16$ to $2,10 \pm 0,14\%$, in 4-month-old animals, from $2,40 \pm 0,15$ to $1,65 \pm 0,12\%$ in 7-month-old animals, and from $1,72 \pm 0,12$ to $1,21 \pm 0,10\%$, in 10-month-old animals, indicating suppressed erythropoietic activity in the bone marrow. Concurrently, shifts in red blood cell indices were observed, showing greater severity with advancing age. Following administration of silymarin, positive dynamics were recorded across all evaluated parameters. The RBC count increased to $7,52 \pm 0,19 \times 10^{12}/L$ in 4-month-old rats, $7,25 \pm 0,17 \times 10^{12}/L$ in 7-month-old rats, and $6,98 \pm 0,17 \times 10^{12}/L$ in 10-month-old animals. Hemoglobin levels rose to $144,6 \pm 2,9$, $143,2 \pm 2,8$ and $139,8 \pm 3,0$ g/L, respectively, while hematocrit improved to $43,0 \pm 0,8\%$, $42,9 \pm 0,8\%$ and $41,9 \pm 0,8\%$. The reticulocyte count also showed significant elevation to $2,68 \pm 0,15\%$, $2,20 \pm 0,14\%$ and $1,55 \pm 0,11\%$ respectively.

Conclusions. The experimental intestinal scarring process negatively affects erythropoiesis, manifesting as a decrease in red blood cell count, hemoglobin, hematocrit, and reticulocytes. Administration of silymarin extract promotes partial recovery of the studied parameters, bringing them closer to control values. The severity of hematological alterations and the efficacy of therapeutic correction are age-dependent.

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