

16. ERYTHROPOIETIN - THE MAIN REGULATOR OF ANTENATAL AND POSTNATAL ERYTHROPOIESIS

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Introduction. The main regulator of erythropoiesis is erythropoietin (EP). Erythropoietin is synthesized in the kidneys, liver, and other organs. The factor that stimulates the formation of erythropoietin is hypoxia of different etiology (anemia, heart failure, lung failure, massive hemorrhage, erythrocyte hemolysis, decreased barometric pressure, etc.).

Aim of study. Analysis of data from the available literature regarding the level and mechanisms of action of erythropoietin in different periods: embryonic, fetal, neonatal and adult.

Methods and materials. Several articles were studied by keywords: erythropoietin, erythropoiesis.

Results. In the intrauterine period the level of EP increases simultaneously with the level of hemoglobin (Hb) of the embryo, and then of the fetus, which have a higher affinity for oxygen. In the umbilical cord and in the newborn, the level of EP is much higher than in the blood of the adult, which indicates an intensification of erythropoiesis. By the second postnatal day, its level decreases as a response of the body to a radical improvement in tissue oxygenation with the transition to pulmonary respiration. As a result of the reduction in the level of EP in the first week after birth in the peripheral blood the amount of reticulocytes also decreases, normoblasts disappear, the percentage of erythrocyte predecessors decreases dramatically in the red bone marrow, and extramedullary erythropoiesis disappears. The first months of life are characterized by a low level of EP, but it can vary depending on hypoxia, the concentration being inversely proportional to the level of Hb. During the second month of life, EP levels increase and are set at the characteristic level of an adult. There are several mechanisms that ensure the secretion of erythropoietin: the direct action of the blood with low oxygen partial pressure on the cells that secrete erythropoietin or by an indirect effect on the activation of the hypothalamic-pituitary-adrenal system which under hypoxia increases the release of glucocorticoids, catecholamines, stimulates the formation of erythropoietin in the kidneys by humoral mechanism and thus intensifies the processes of erythropoiesis in the red bone marrow.

Conclusion. The production of erythropoietin is regulated by the degree of oxygenation of the tissues. The body is able to compensate hypoxemia (regardless of the causes that caused it) with an increase in the level of EP production. As a result, erythropoiesis is stimulated, and the level of oxygenation of the tissues increases.