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НОВЕ У ВИВЧЕННІ МЕХАНІЗМІВ РОЗВИТКУ АНЕМІЙ

THE NEW IN ANEMIAS DEVELOPMENTAL MECHANISMS

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Anemiae belong to rather significant problem of modern humanity; they describe blood system state but it is also known that they are met at other systems pathological conditions and even rather often are secondary and depending on their development.

Pro-inflammatory cytokines at renal pathologies and erythropoietin resistance were found at them as belonging to anemia developmental mechanisms; X-linked actinopathy was found to be determined in people with DOCK11 (cytokinesis dedicator playing a central role in actin cytoskeleton regulation) deficiency. Intestinal hypoxia-inducible transcription factors were detected to be essential for iron absorbtion following iron deficiency as well as pathogenic microflora. Tumor-directed dysregulation of erythroid progenitors drives immunosuppressive myeloid cells [1, p. 597–599]. The term “cancer-associated anemia” was introduced in a medical scientific literature not so long ago [2, p. 801–813]. It was established that elevating fetal hemoglobin with a new genetic technologies allows to assess this Hb disturbances at sickle-cell anemia and beta-

thalassemia [3, p. 845–852]. Fetal Hb levels are thought to be potent secondary genetic modifiers of alpha-thalassemia; new data have an information concerning differential proteomic patterns of plasma extracellular vesicles demonstrating potential to discriminate beta-thalassemia subtypes [4, p. 31]. Extracellular vesiculation at beta-thalassemia was stated by the scientists to be as a potential biomarker for the spleen functional status and ineffective erythropoiesis. It is interesting to mention that neutrophils were found to be as drivers of vascular injury in sickle-cell disease [5, p. 302–312]. A separate significant attention is paid to the congenital dys-erythropoietic anemias genetics and pathophysiology [6, p. 126–136.]. It is important to emphasize that four alpha-globin genes complete deletion leads to the most severe phenotype known as Hb Barts', one alpha-gene presence defines Hb H appearance with thalassemia phenotype. It is unexpectedly that non-deletional thalassemia forms were discovered to have more severe phenotype compared with the deletional forms [7, p. 166]. The researches demonstrated that DNA methylation contributed into beta-globin cluster at beta-thalassemia [8, p. 187].

It is necessary to know that microangiopathic hemolytic anemias were found to be at thrombotic microangiopathy together with thrombocytopenia and inner organs hard ishemy at renal insufficiency [9, p. 591–605]. Additionally, thrombotic microangiopathy accompanied by anemia, thrombocytopenia and organs ishemy received a name as atypical hemolytic uremic syndrome [10, p. 200–205]. Such a situation with lowering in Er and platelets number together with inner organs ishemy can be observed at DIC-syndrome.

It is rather important to realize a proper differential diagnostics between separate anemiae. Mentzer Index is used to carry differential diagnosis between thalassemiae and other hemolytic anemiae out. Speaking about aplastic anemias, it is worthy to note that thrombopoietin receptors agonists were showed to be effective at aplastic anemias in part through mitochondria homeostasis normalizing. When giving an information about Diamond-Blackfan anemia pathogenesis mechanism, we'd like to mention that it was detected to be connected with an atypical form of ribosomal unit, defect in the ribosomal RNA maturation as a consequence of a heterozygous mutation in 1 of the 20 ribosomal protein genes, erythroid hypoplasia and erythroblastopenia because of apoptosis activation [11, p. 353–360].

As for new-borns, Er hemolysis rate is assessed at hyperbilirubinemia of new-borns at jaundices. Iron deficiency as one of a separate anemias expression was found out to be such a cause of hippocampal degeneration and synaptic plasticity disturbances at transcriptional level. It is clinically important to know that perinatal iron deficiency can be considered as schizophrenia early risk factor [12, p. 2218–2227]; immunohemolytic and

pure red cell aplastic anemiae can be also connected to schizophrenia development [13, p. 329–336]. Psychiatrists have established an association of transferrin gene polymorphism with cognitive deficits and chronic schizophrenia symptoms. Vitamin B12-deficient anemia was accompanied by psychoses and dementia in the patients. It is also unexpectedly that anemia rapid development was observed in HIV-positive people. Chromosome instability as disturbed DNA repair, damaged DNA replication were detected in Fanconi anemia; also the inflammation and oxidative stress represent pathogenesis factors at this anemy as well as disordered ribosome biogenesis. Human Fanconi anemia genes and problematic proteins were differentiated; p53-dependent and independent apoptosis has a role in up-regulation of p21 Fanconi anemia. There are connections between this anemia and cancer [14, p. 69–82].

Our brief literary review was dedicated to some new hereditary and acquired mechanisms of various anemiae. Of course, their list is not exhausting. Anemias study is in a process.

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