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Editorial

Platelet Hemostasis or the Boundary between Health and Disease

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Editorial

Mobilization of thrombocytopoiesis reserves may also release an increased number of immature platelets in the peripheral blood (left adaptation shift). It is known that these young or immature platelets are functionally and metabolically active more than the resting ones [1]. These parameters are now available, but they are not reported because clinicians are not aware that they are available, and the reference ranges with which the patients' results should be interpreted are not known. Our studies of thrombocytopenic patients using an RNA polymethine dye similar to thiazole orange and flow cytometry (the Sysmex XE- 2100 Kobe, Japan) showed that the immature platelets fraction (IPF, %) may increase in consumptive disorders and decrease or remain normal when marrow suppression is present.

The project aims at early detection of activation markers of blood, - access to platelets containing RNA (immature platelet fraction, IPF)- during adaptation to physiological (age, donors, pregnancy, weightlessness) or pathological (thrombocytopenia, thrombosis, preeclampsia and professional diseases, in which the genesis of dust aerosols, electromagnetic fields and other physical and chemical factors [2-6]. Value of the project is to obtain new data that is important for understanding the mechanisms of hematopoiesis response to the impact of factors internal and external environment in which process is the selection of a sufficient number of functionally active platelets and preparation of the body to life in conditions of increased requirements for hemostasis. The study included 107 female and 316 male subjects, 19-88 years of age. Research analyzes morph-functional features cell hemostasis using computer analysis of PAS-stained cell images on the ASPBC system (Russia) [6], IPF - on automatic hematology analyzer Sysmex XE- 2100 (Sysmex, Kobe, Japan) and the ability of platelets to form aggregates - analyzer ALAT2- "Biola" (Russia). The data obtained was compared with coagulo grams and tromboelastogramma as well as with the results of a comprehensive clinical and laboratory examination. In summary, the reference range of IPF: in control Group of male (n= 87) -1.6±0.9 from 0.3 to 4.6% and in Group of female (n= 29) -2.3±0.2 from 1.1 to 7.0%, obtained in this study compared well with the results in the literature [7].

The IPF% was statistically associated with the proportion of PAS positive platelets PLTs: rS=0.63, n=21, p< 0.05. The alterations found in platelet morphology were not specific for any disorder. However, it was found that the magnitude IPF or PAS-positive cells from human donors or physically trained men (project Mars-500) significantly higher than control values of parameters, thus demonstrating a sort of protection from the forthcoming donation or a possible bleeding. Extreme higher values IPF in association with danger of tissue injury was common in pregnancy, allergic asthma (Industry pathology), coronary artery disease and idiopathic thrombocytopenic purpura, correlating negatively with thrombocytopenia: rS= from -0.20 to -0.46, p< 0.001. In summary, the reference range obtained in our study compared well with the results in the literature [8-10]. Taken together these findings suggest that, the IPF is an early marker of the thrombocytopoiesis adaptation deviations on one hand but may be part of the causal link between thrombocytopoiesis and systemic endothelial cell change, on the other hand. Applied value is to establish the objective criteria for clinical and laboratory improvement methodologies for accurate testing of platelets, which will allow doctors to monitor therapy and to obtain new data needed to predict bleeding, thrombocytopenia and thrombosis. Thus, we have to pay attention to these conditions for the clinical application of IPF, %. The data obtained may be important to address the fundamental problems of human adaptation to environment. The increase in IPF is, thus, an early indicator of platelet destruction. Moreover, increase in immature platelet values might reflect increased thrombotic risk.

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