Variations of geomagnetic field and background neutrons are unified mechanism for regulation of functional human blood activity

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Nowadays, certain hematological indices are considered as a high sensitive indicators for estimation of cosmophysical affects [1]. Among these indices the leukocyte index discovered by N.A.Shults is the most well-known. It was shown [1], that the amount of leukocytes in the peripheral blood are decreased under increase of geomagnetic activity and the quantity of leukocytes has negative connection with number of sunspots. In our research the connection of geocosmical indices with peripheral human blood indices was studied using traditional statistical methods. The global, regional and local indices associated with solar activity were included: number of sunspots (R); the solar wind density (N) and velocity (V); solar protons with 10MeV and 60MeV energy (Pr10, Pr60); signs of sector structure and variations of interplanetary geomagnetic field (IMF, sigma_B, |B|, Bx, By, Bz); planetary and local geomagnetic activity indices (Kp, Dst, rh-max, delta_H, rh-aver, KPK1,KPK2,KPK3, KPK4); atmospheric pressure and background neutron count (Neutron). The daily morphofunctional characteristics of peripheral blood were obtained from schoolboys-volunteers during one month in October-November, 1991[2]. For this purpose, the assessment of complete blood count: the total leukocytes quantity (Leu); haemoglobine level (Hem); the erythrocyte sedimentation reaction (ESR); the number of stick-nuclear and segmented neutrophils (Segm), eozinophils (Eoz), limphocytes (Lph), monocytes (Mon) were performed. Moreover the phagocytosis (Phag) and the metabolic stimulation of granulocytes (NBT) with using of zimozane and nitroblue tetrazoly and also indices of reaction vesicular-formed (RVO) were investigated [2]. Indices of RVO were accounted for the number of vesicules (NVes) and their common square (SVes) in the blood reaction in vitro [3]. It was shown that the certain white blood cells (Segm, Lph, Mon) manifested a high sensitivity to variations of geocosmical agents, during which the signs of correlations with geocosmical agents depended on blood cell function. Segm and Mon have significant negative signs of correlations with global and local geocosmical indices, associated with solar activity increase (R, V, Kp, rh-indices) and positive signs with Neutron. Lph on the contrary, have positive connections with geoeffective agents and negative sign correlation with Neutron. For phagocyting cells (Fag) there was found the largest number of connections with geocosmical agents, including R (-); N (+); V (-) ; Pr10 (-); Pr60 (-) ; Bx (+), Bz (+), Kp (-); Dst (+); Atmospheric pressure (-); Neutron (+); rh-indices (-). RVO-indices turned out to be the most promising for studying geocosmical effects among the indices of polimorphonuclear leukocyte reactions. There was not found any significant connections of Hem-indices with geocosmical indices. There was not found either any significant connection between leukocyte indices and the number of sunspots, but a significant negative connection was found with geomagnetic activity. Since an integral system controlling blood functions and immunoregulation are presented by such blood cells as Segm, Lph, Mon and the separate elements of this system have different but significant connections with geomagnetic activity and neutron background variations one could be asserted that variations of geomagnetic field and background neutron are unified mechanism for regulation of functional peripheral blood activity.

References

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