

# **Possible psycho-physiological consequences of human long-term space missions**

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Experiments carried out on the Earth's surface during different years and under contrast periods of solar activity have shown that the functional state of biosystems, including the human organisms, are controlled by global and local geocosmical agents. Our findings have a close relation to space research because they demonstrate the reactions of biosystems on variations of global and local geocosmical agents and the mechanisms of modulations of biosystems state by geocosmical agents. We revealed the role of variations of the geomagnetic field for the stimulation of immune systems, functional state of peripheral blood, human brain, growth of microflora skin covers and pathogenic microorganisms.

The study of the psycho-physiological state of the human organism has demonstrated that an increase of the neutron intensity near the Earth's surface is associated with anxiety, decrease of normal and increase of paradox reactions of examinees. The analysis of the human brain functional state is dependent on the geomagnetic variation structure, "dose" under exposure to the variations of geomagnetic field in a certain amplitude-frequency range and also the intensity of the nucleon component of secondary cosmic rays showed that the stable and unstable states of the human brain are determined by geomagnetic field variations and the intensity of the nucleon component. The stable state of the brain manifested under the periodic oscillations of the geomagnetic field in a certain amplitude-frequency range. The low level of geomagnetic activity associated with an increase of neutron counts and also the advent of aperiodic disturbances, may lead to an unstable state of the brain. The connection of the human psychological state with global geocosmical agent fluctuations was analyzed by the "comod-technology" on the basis of medical and solar data, which confirmed that the variations of the geomagnetic field may be responsible for an unstable state of the human brain and the corresponding emotional reactions. It was shown that parameters of the interplanetary media associated with a low level of geomagnetic activity were closely related with indices of unstable emotional states: anxiety, depression, hysteria, psychosis, etc. An examination of the connection between the psychoemotional

state, geocosmical and meteorological agents allows to suggest that the human psychoemotional state is continuously under the "control" of geocosmical agents. When the values of these parameters correspond to a low level of geomagnetic activity and an increase of the nucleon intensity on the Earth's surface, the state of mental instability or nervous excitability is manifested. We believe, that the unstable psychoemotional state should be more pronounced on board of spacecraft during space research missions. Thus, the increase of particle fluxes in space environment and decrease of strength of the geomagnetic field could be hazards for the psycho-physiological state of human organism during space explorations.

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