

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Interactive Presentations (IP)

Author: Dr. Anna Chernikova

SSC RF Institute of bio-medical problems RAS, Russian Federation, anna.imbp@mail.ru

Prof. Roman Baevsky

SSC RF Institute for bio-medical problems RAS, Russian Federation, rmb1928@mail.ru

Dr. Evgeny Bersenev

Institute of Biomedical Problems (IBMP), Russian Academy of Sciences (RAS), Russian Federation,
bersenev_evgenii@mail.ru

Ms. Olga Isaeva

SSC RF-Institute of Biomedical Problems RAS, Russian Federation, olga.isaeva33@yandex.ru

INDIVIDUAL PRENOSOLOGICAL CONTROL AS NEW DIRECTION IN PERSONALIZATION OF
PREVENTIVE MEDICINE IN SPACE AND ON THE EARTH.**Abstract**

Background. Individual "health route" is typical for each person, following which it is possible to keep health and high functionality. The main trends of medicine in 21 century are realized in Russian system of crew members medical care: preventive directivity, telemedical technologies and personalization in health evaluation and managing. These principles don't only successfully "work" in space, but are actively used on the Earth. It refers to prenosological diagnostics and creating appropriate automatic systems. Some first systems for mass preventive examinations were designed in 80-h years of past century, and the work towards design of systems for individual prenosological control actively goes now (Baevsky et al., IAC 2014). In spite of attractiveness and successful using of heart rate variability (HRV) analysis method in medicine and physiology, the researchers often appear the difficulties when interpreting the results, particularly when evaluating the individual dynamics by reason of strong interindividual differences presence. To overcome these limitations we had proposed to make probabilistic estimation of cosmonauts functional conditions accordingly to HRV analysis based on the identified type of autonomic regulation in microgravity (Baevsky et al, 2011) and developed the concept of adaptation risks which allows to assess and forecast functional conditions of cardiovascular system in cosmonauts (Chernikova et al., IAC2012).

Materials and methods. The main research method was HRV analysis from ECG data in experiments "Pulse" and "Pneumocard" at ISS (34 men, age 44 4,2 year); ECG data from "Ecosan-2007" device in experiment "Mars500" (6 men, 28-36 years); FPG data from "Delta-2013" system (2 men, 4 women, age 25-67 years). The further development of these studies was the complex "Ecosan-TM" intended for mass preventive examinations and developing of system for data personalization to take into account individual particularities of autonomic function.

Results. By results of first individual examinations personal databases has been formed for evaluation of functional conditions. Individual fluctuations of functional conditions were revealed in participants of studies, up to prenosological. Using the designed personalization system has allowed more clearly reveal changes in functional conditions, associated with stages of space flight and experiment, with different loads. The traditional approach when assessed parameters are compared with some standards not always demonstrates essential individual dynamics.

Conclusion. Using the system of personalization allows more clearly reveal the individual health risks, correlated with HRV reduction. We are talking about development of new approach to evaluation and management of individual health.