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CREATION OF A DATABASE OF THE MICROBIOME OF ASTRONAUTS

Abstract

Today, the problem of the possibility of accumulation of pathogenic microflora in conditions of closed inhabited objects is actual topic. It is especially important when planning interplanetary bases in the conditions of the moon and during long interplanetary flights. During microbiological examinations at the International Space Station, it was shown that one of the main features of the human-microorganism ecological system in the environment of manned spacecraft is the periodic accumulation of pathogenic potential from microorganisms. The aim of the work was to form a database of the microflora of cosmonauts at various stages of the spaceflight. Method. The database is designed to assess the evolution of the population of microorganisms in different biotops of cosmonauts body before, during and after the spaceflight. Information about the microbiome of cosmonauts has been streamlined and entered into the database since 1976. The database contains information about the microflora of astronauts in various parts of the body: forehead, chest, neck, ear, arm, armpits, groin, intestines, plaque, oral cavity, pharynx, tongue, nose, cheek. Experimental samples of microflora obtained from the ISS are stored in deep freeze, are investigated using a standard bacteriological method, molecular biological research and immunochemical methods. The database contains a code corresponding to a particular cosmonaut, his age, the period and time of taking the sample, and the biotope for which a qualitative and quantitative microbiological analysis was carried out. For the oral cavity, the presence of periodontopathogens, as well as the concentration of immunoglobulins and cytokines. Results. The information obtained makes it possible to assess the norm and dysbiotic state of the cosmonauts microflora. The database can be constantly updated. Thanks to the adapted database format, it is possible to use the methods of neural networks and BIG DATA for analysis. Analysis of the dynamics of the quantitative and qualitative characteristics of the microflora of cosmonauts testifies to the periodic nature of the accumulation of the potential of pathogenicity. In the oral cavity, under the influence of spaceflight factors, there is a violation of at least two barriers to colonization. It is a barrier formed by the commensal microflora and a barrier formed by humoral immunity. Thus, the creation of a database makes it possible to determine the microbial status of an astronaut and early detection of dysbiotic changes preceding the development of tissue inflammatory processes at an early stage, which will accelerate their correction.