

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Medical Care for Humans in Space (3)

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PRELIMINARY STUDIES ON THE EVALUATION OF PROBIOTIC EFFECTIVENESS IN
SPACEFLIGHT

Abstract

Disbacterioses are known to be caused by several factors occurring in spaceflight, i.e. weightlessness initiating the translocation of microflora to the upper part of the body, stress, the high possibility of microbial spreading from donors to recipients in confined habitats etc. For disbacterioses prophylaxis a wide-range probiotics are elaborated. However, up to now there have been no signs as to whether bacteria, which are in the contents of medical probiotics, are able to colonise the intestine for a long time. The researches, which were dedicated to learn the effectiveness of the correction of the microflora of mammals in spaceflight, were divided into 2 parts. The first part of our investigations was dedicated to the following 2 items: to learn the characteristics of the changes of Mongolian gerbil microflora in the 12-day spaceflight of the automatic spaceship Photon M3; to prepare the lactobacilli rifampicin-resistant mutants as markers for further attempts to investigate the destiny of the probiotics strains and to investigate the stability of the rifampicin resistant mutant growth in spaceflight during the 12-day spaceflight of the automatic spaceship Photon M3. The Mongolian gerbils were exposed in a 2-week spaceflight. The intestinal microflora of the gerbils were tested prior to the launch and just after the flight. In parallel, rifampicin-resistant clones of the *Lactobacillus plantarum* probiotic strain was prepared and inoculated in tubes located in a thermostated container to be launched in the Photon M3 mission. After the flight the rifampicin resistance of the clones were tested. The performed postflight studies allowed us to come to the following conclusions:

1. There are disbacterioses in the control group of Mongolian gerbils, especially reflected by a lack of lactobacilli. So Mongolian gerbils are suitable to be fit and reliable objects for further study of the effectiveness of the consumption of prophylactic lactobacilli-containing probiotic preparates.
2. The investigation of *Lactobacillus plantarum* rifampicin-resistant clones after the flight revealed the stability of resistance in spaceflight. So these clones will be ready for further investigations of the stability of probiotic strains in spaceflight. The second phase of our investigations is planned to be on the BION-M1 mission, which will be devoted to the performance of investigations aimed at performing studies to learn how the marked *Lactobacillus* strain will colonise the gerbils intestines and to estimate the effectiveness of the correction of disbacterioses.